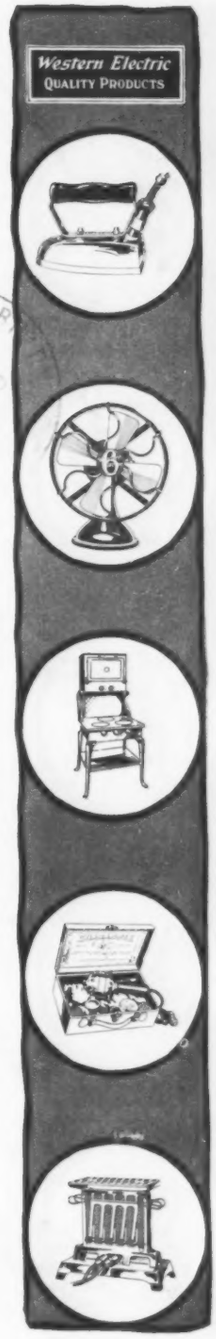
In This Issue *The call to service for Women in the industries of the West—and departments of vital interest to men of the electrical industry throughout this vast section*

JOURNAL OF ELECTRICITY

VOL. XXXIX NO. 8 SAN FRANCISCO, OCTOBER 15, 1917 PER COPY, 25 CENTS

THE *Western Electric* WAY



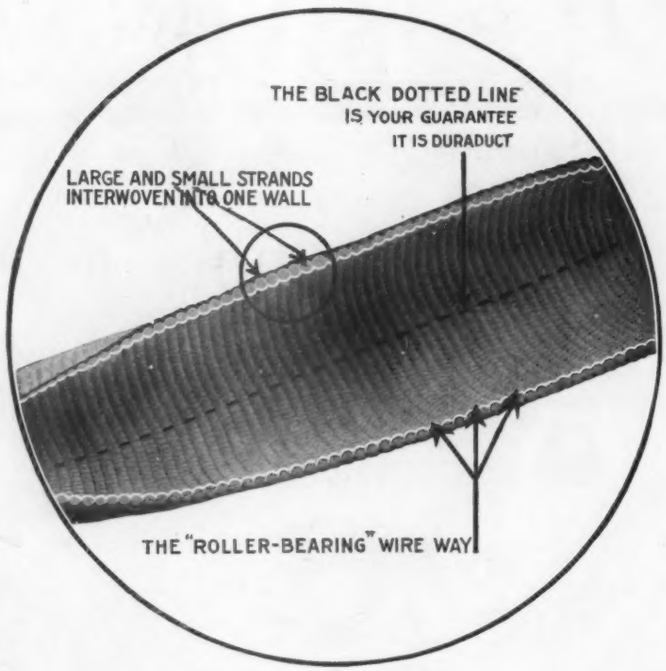
An Electrical Merchandising Manual

It shows pictorially the extent of our advertising in the popular magazines.
It fully describes the various Western Electric Quality Products.
It catalogs the free sales helps available for our merchant-customers in identifying their stores as places where these nationally advertised electrical goods may be purchased.

Write for it.

Western Electric Company
INCORPORATED

SEATTLE SAN FRANCISCO
PORTLAND LOS ANGELES



A few reasons for the popularity of

DURADUCT

(Reg. U. S. Patent Office)

The special construction shows its value.
The single wall prevents the blistering inherent in multiple wall types of conduit.
The "Roller-Bearing" wireway makes fishing easy.
The black dotted line identifies it.
All good jobbers sell Duraduct.

Pacific Coast Distributors

BAKER-JOSLYN COMPANY

526 First Ave. So. Seattle
71-75 New Montgomery St. San Francisco
353 East Second St. Los Angeles

THE BLACK DOTTED LINE IS THE MARK OF DURADUCT

OCT 23 1917

©CIB397060

JOURNAL OF ELECTRICITY

Devoted to the Generation, Distribution and Utilization of Energy

VOLUME XXXIX SAN FRANCISCO, OCTOBER 15, 1917 NUMBER 8

[COPYRIGHT 1917 BY TECHNICAL PUBLISHING COMPANY]

INDUSTRIAL OPPORTUNITIES FOR TRAINED WOMEN

BY CLOTILDE GRUNSKY

(Service to the nation is making its striking appeal on all sides. The crisis due to the increasing scarcity of men in the industries makes the advent of women, in new and untried fields of endeavor, an appalling necessity. A casual glance at the technical and industrial activities of England reveals the marvelous new tasks that women are efficiently undertaking in the British Isles, as was called to the attention of our readers in editorial comment in the Journal of Electricity for June 1, 1917, page 455. Here is a brief survey of present industrial activities for women throughout America, which has been gathered by the author in an extensive nation wide research for the Collegiate Alumnae of America, as announced in our editorial columns. This brilliant writer will in the future devote all of her time to editorial activities of the Journal of Electricity in the capacity of associate editor and in charge of service and welfare work.—The Editor.)

Due to the present national crisis, women, inspired by a desire to do their bit, are looking to the industries as avenues of service. The spirit which led an English young woman of means to offer her services as a cook because "cooks were needed," is stirring in our own young women and making them ready for service in the factory and in the yards—wherever they may be in demand.

This emergency help, however, called upon in the moment of need, is of necessity untrained in character, and in so far as it is inspired merely by the idea of national service, is temporary. Should the war cease tomorrow, on the other hand, a revolution in the employment of women would already have been accomplished, the effects of which will be permanent.

WOMEN MOULDERS IN A FRENCH MUNITIONS FACTORY

America is faced with a shortage of labor such as Europe has already been forced to meet—but our women will rise to meet the need as have those of France. The picture is copyrighted by the International Film Service.

Much of prejudice has already gone from the mind of the employer. Though he may not as yet have employed a single woman in a position not hitherto open to her, yet he has looked forward to the time when he might have to do so and has considered the case as not quite an impossibility. He has looked to the example of England with a new interest and noted how the number of women workers in indus-

WELFARE WORK IS WOMAN'S FIELD

The General Electric Company has rest rooms and kitchens in connection with their offices in practically all of the larger cities—and a woman in charge of each. Above is shown the rest room of the San Francisco office with a glimpse into the lunch room beyond.

trial occupations has increased from about 90,000 before the war to some 390,000 at the present time. He has heard the tale of manufacturers from abroad and in our own country who have tried out women in all types of industrial service and found them equal—in some cases, superior to the men.

The conditions in our colleges are a fair indication of the change in attitude which has already taken place among the women. For many years back the women graduates from our western colleges have divided into groups in about the following proportions: 50% marry, 30% teach, 15% drift and 5% find employment in other occupations. Of last year's class from Barnard College, New York, however, about 50% went into employments other than teaching, and I think if it were possible to obtain figures for the undergraduates of such an institution as the University of California, these proportions would be found to describe the situation of this year. The freshman class is entering college with the idea of service fully awakened in their minds and the young women are preparing themselves not for a war service, for few are so pessimistic as to believe the war will last another four years—but for a service to their community through the industrial world after the war. The enrollment of 150 young women in the electrical engineering courses of the University of Kansas is just a sign of the times. With the fall term at the University of California, we find four women enrolled in Professor Raber's course in auto-vehicle construction and six taking a course in wire and radio telegraphy.

Opportunities in the Electrical Industries

After all, however, the stimulus which war demands are giving to all industry, will be felt most in the increase of woman's work along those lines in which she is already recognized. For young as she is in the industrial world, there are already certain fields counted properly as hers. Welfare work, the care of women employees in factories, the supervision of the home life of men employees, is almost entirely in her hands. Really remarkable work along these lines has been done in the big telephone offices, by such a factory as that of the National Lamp Company in Oakland, for instance, and in connection with large office forces, such as that of the General Electric Company in its western office.

The office work itself is coming to be largely in the hands of woman. Cashiers, bookkeepers, secretaries—even accountants, statisticians and efficiency experts in office methods are not unknown. An Eastern firm has recently made the addition to its staff of a college woman whose duty it is to supervise the letters which go out of the office for their English—and generally to care for the diction and grammar of those employees who come in touch with the public.

Employment work is a field in which women have shown themselves unusually proficient—and there is more than one firm in the West which has put this department into feminine hands. Occasionally under the same supervision but developing more and more into a separate work, is the teaching of salesmanship. This new field of service originated in Boston but its value is being more and more recognized in the west. Already our large department stores are finding their Educational Director indispensable. This particular form of the work applies only to those concerns which sell to the public, of course, but the schools for telephone operators and kindred departments are a recognition of the same type of need in other fields.

Several of the large public utilities corporations of the east have gathered together a library of their own along their particular subjects. A new field, that of business librarianship, has developed out of this, drawing its recruits from the industrial world, from the public or private library and from the colleges. As the librarian is usually required not only to provide the books required, but to look up subjects and abstract reports along technical lines, it is obvious that in most cases she must have a background of special scientific training as well as a knowledge of one or more foreign languages.

WINDING AN ARMATURE IN FRANCE

Women are already to be found in every branch of electrical work in France. Copyrighted by the International Film Service.

The whole field of demonstrating, of course, is a woman's work. Particularly in the marketing of such appliances as the electric range, women are employed to teach home economies and electric cooking to prospective purchasers and later to go into the homes where electric ranges have been established and demonstrate their use. One Western food company has employed a woman trained in domestic

science to teach the cooks of ocean liners how best to use their product—and similar work is being done by some of the larger electric companies.
more foreign languages.

The whole field of demonstrating, of course, is a woman's work. Particularly in the marketing of such appliances as the electric range, women are employed to teach home economies and electric cooking to prospective purchasers and later to go into the homes where electric ranges have been established and demonstrate their use. One Western food company has employed a woman trained in domestic science to teach the cooks of ocean liners how best to use their product—and similar work is being done by some of the larger electric companies.

Women who have specialized in food preparation and supervision find opportunities in the management of cafeterias, such as the telephone companies and electrical factories have installed for their women employees. Occasionally, too, a pamphlet is issued as advertising matter which requires an expert knowledge of home economics—of the principles of laundering clothes, for instance, to advertise an electric washing machine—and a woman is usually found to be the author of this.

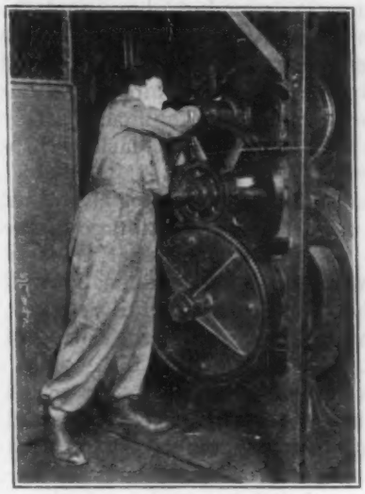
The whole field of advertising is one properly open to women. Women have not as yet gone into the technical sides of this work in the west to the extent that they are to be found in eastern factories and technical concerns, but they are to be found making show cards, painting signs, writing and illustrating advertisements for agencies, and decorating windows. This is a field which seems properly to belong in woman's province—and might well be advanced to its place as an art in place of a haphazard industrial incident.

The whole field of artistic endeavor is open to women and they will be found among the ranks of designers of metal work and lamp shades and kindred accessories to the electrical trade.

The Technical Branches of Electricity

It is obvious that as yet, few women are to be found in the technical branches of electricity. One young woman of the east has made a place for herself as a lighting expert and illuminating engineer—in California, two women have succeeded in the field of civil engineering. On the whole, however, up to the present, woman has not been welcome in technical fields, nor has she wanted to come.

Isolated instances of women's success are to be found in almost every line of work, of course. Indeed, the general impression to be gained from a survey of women's activities is that a woman can make a success of almost any field she attempts, provided she has the initiative and is willing to make the sacrifice incidental to her choice. In a recent bulletin published by the Intercollegiate Bureau of Occupations of New York City, some 800 occupations other than teaching are listed in which women are now actually engaged. About 200 of these fields are represented in our western world. The absence of big industrial establishments along certain lines, the general well being of the community and the lessened economic necessity for the woman, the absence of channels through which positions of a higher type may be obtained, explain in large measure this discrepancy.



A WOMAN ELECTRICIAN

This young American girl is an expert electrician, and anxious to do her bit, having applied for a card in the electricians' union. Copyright by the International Film Service.

The college, of course, must be looked to as a source of supply in the higher technical fields. An incomplete listing of the college women now actually at work in the state of California gives some idea of their distribution:

Activities of Women in California

Agriculture	35
Artistic Pursuits	14
Business	17
Civil Service	34
Domestic Science	12
Library Work	40
Literary Work	20
Scientific Pursuits	27
Secretarial Work	30
Social Service	65

In comparison with figures from eastern localities it is at once obvious that trained women are not repre-

WOMEN WITH THE TELEPHONE COMPANY

The management of cafeterias, telephone schools and welfare work generally is in the hands of women. The picture shows the type of work done by the Pacific Telephone and Telegraph Company in the great West. The views shown are the telephone operating room, the rest room and the lunch room provided for the young women in the telephone service.

sented in the business and industrial world in anything like the numbers prevailing elsewhere. The reasons for this are two. In the first place, the employer has not learned to look for his labor supply to the women trained industrially or educationally—he is not familiar with the woman worker who has proved herself (elsewhere) capable of earning more than her untrained sister, and he does not offer sufficient salary inducement to attract women from the teaching profession.

The college woman in particular, on the other hand, has not learned as yet to take advantage of the opportunities open to her. The traditional fields of teaching and library work have been unusually well paid and uncrowded here in the west until recently, and women have not been forced to face the daring of the newer occupations.

The war, however, is changing this. An actual shortage of men in the face of increased industrial activity is forcing employers to look to women as a possible source of help. We read of chemical companies taking women into their laboratories, telephone companies into their service departments. Women taxicab drivers and railroad hands are still novelties, but there is some promise that we may become better acquainted with them.

A new era is at hand, whether we will or no. In the present emergency we must look for women to enter those lower branches of technical work where they may begin as untrained workers and gain their special education in their work. With the new ideals of service and the breaking down of many barriers of prejudice, we must count on women preparing themselves for the higher fields and taking their places side by side with the men, supplementing rather than supplanting their work.

THE EFFECT OF MOUTHPIECES ON THE FLOW OF WATER THROUGH A SUBMERGED SHORT PIPE

An investigation has been completed by the Engineering Experiment Station, University of Illinois, under the direction of Fred B. Seely, associate in theoretical and applied mechanics, to determine the effects of mouthpieces upon the flow of water through a submerged short pipe. A knowledge of the extent of the loss of head due to contraction or expansion of a stream is of considerable importance in a variety of hydraulic problems. For example, it may be possible, through attention to the shape and angle of connections and intakes to increase the flow through the suction and discharge pipes of low head pumps, through large valves, through locomotive water columns, through the sluiceways of dams, through culverts and short tunnels, etc.

It is to be noted that losses of head due to contraction or expansion of a stream, which may in themselves be of relatively little consequence, may have a considerable influence upon subsequent losses because of the turbulent motion started by the contraction or expansion.

The results of the investigation are set forth in detail in Bulletin 96 of the Engineering Experiment Station, copies of which may be obtained gratis by addressing C. R. Richards, Director, Urbana, Illinois.

WHY THE SHIELDS WATER BILL SHOULD PASS

(Here is an excerpt from The Congressional Record setting forth tersely the reasons why the Shields Water Power Bill should be passed by Congress. The statement is by Senator Jones of Washington. Frequent editorial comment has been made in the columns of the Journal of Electricity relative to the crying need of just such legislation as this in order that hydroelectric development in the West may be made an efficient tool for the upbuilding of a vast empire, potent with possibilities of industrial and agricultural prowess under reasonable governmental encouragement for private enterprise. —The Editor.)

It is vitally important to the economic and commercial welfare of this Nation that Congress no longer delay the enactment of laws under which our wasting water powers may be developed. The following brief statement shows the importance of the immediate passage of such legislation to the State which I have the privilege of representing in part in the United States Senate:

Of the 9,700,000 water horsepower in the State of Washington requiring Federal consent before it can be utilized, but 96,000 horsepower, or 1 per cent has been developed, and the remaining 99 per cent, or 9,600,000 horsepower is going to waste. Meanwhile we are importing coal from Canada; vast areas of silent desert lands, which, given water, would yield great harvests in these days of food shortage, are held back from reclamation through lack of cheap electric energy for operation of pumping plants; three transcontinental railroads are unable to electrify their systems across the State, and industrial plants, the establishment of which would give us the diversity of industry so badly needed to further our progress and prosperity, are prevented from building.

By provisions in the river and harbor act of 1890 and 1899 Congress has prohibited the placing of dams in navigable streams without the consent of Congress in each case. No executive authority, unless the stream lies wholly within a single State, in which case the State legislature may grant the authority, subject to approval of plans by the Secretary of War. As navigable streams almost invariably touch or traverse more than one State, the exception is unimportant.

An existing statute passed by Congress in 1910, known as the general dam act, prescribes the terms under which dams may be placed in navigable streams when Congress grants specific consent. This statute, even if made operative by an enabling act, makes requirements which render investment unsafe and effectually prevents development. During the first two years after the passage of this statute Congress granted its consent to the development of 12 water-power projects in navigable streams, of which but two have been developed, and their financing was only made possible because they were adjuncts to existing systems.

The other 10 could not be financed under the restrictive terms of the permits granted. Not a single water-power project has been developed in a navigable stream during the past five years. During these years water-power projects actually formulated and ready for development, located in 17 Southern and Western States, aggregating 2,122,000 horsepower, have been prevented from development, as no responsible banker,

trustee, or business man would invest a dollar upon the security afforded by such permits. The production of this energy through utilization of water horsepower now wasting would save annually 8,427,000 tons of coal, would allow the labor of 7,000 men to be used for other much-needed purposes, and would permit the use of thousands of cars for carrying merchandise instead of coal. Furthermore, by these river improvements 1,160 miles of inland waterways would be opened to navigation without the appropriation of Government money.

The importance of action is realized by Congress, which has had the enactment of a new navigable stream water-power law under consideration for the past four years. A bill drawn and introduced by Senator John K. Shields, of Tennessee, was passed by the Senate at the last session by a vote of 46 to 22, after a discussion covering a period of five weeks, during which time every phase of the question was carefully considered. The bill was amended by the House and sent to conference, was not reported out, and died with the close of the last Congress.

Senator Shields reintroduced the bill (No. 1419) at the present session, and it has been reported without amendment to the calendar by the Commerce Committee, of which I am a member, and will undoubtedly again be passed by the Senate when its consideration is reached. The bill has been criticized by so-called conservationists for reasons which I shall not attempt to controvert because, to my mind, they are manifestly impracticable and, if adopted, would effectually prevent development.

The bill appeals to me as an orderly, masterly product of high-class statesmanship. It safeguards every public interest, and yet its terms are fair toward those who would engage in the naturally hazardous business of development of water powers. Senator John K. Shields, the author of the bill, is one of the most respected members of the United States Senate. He was formerly chief justice of the Supreme Court of Tennessee, and the development of its water powers is of greatest importance to his State. I am glad to be able to say that this important national question was not made a party issue in its consideration by the Senate, and I am glad, as a Republican Senator, to be able to line up alongside the great Democratic Senator from Tennessee in approval of his views upon this subject.

The Shields bill authorizes the Secretary of War to issue permits to develop water powers in navigable streams to properly qualified applicants who, in his judgment, are best fitted, in the public interest, to develop the water resources. The bill sets forth at length general terms and stipulations, and the Secretary of War is made the administrative authority to carry them into effect. The bill provides for a permit period of 50 years, at any time after which the Government may, on two years' notice, take over the property for itself or for a subsequent grantee by paying the fair value of the property, not including the rights granted by the Government. The bill provides for protection of the public interests as follows:

(a) Water-power projects for which permits are issued must be such as in the judgment of the Secretary of War shall be best adapted to a comprehensive plan for the improvement of waterways for all uses and produce the highest practicable power development.

(b) The public-service commissions of the States in which the water powers are located are given control of rates and service when the business is intrastate, and the same regulatory authority is conferred upon the Interstate Commerce Commission when the business is interstate.

(c) The Secretary of War is given authority to examine the books of the grantee and to require them to submit sworn statements of every detail of their business transactions.

(d) Provision is made for cancellation of the grant in case the grantee fails to comply with the terms.

(e) Unlawful trust or monopoly or restraint of trade is forbidden.

(f) The grantee is required to install, at his own expense, locks, booms, sluices, lights, signals, or other structures in aid of navigation purposes, and furnish, free of cost, power for operation of same.

(g) The grantee must reimburse the United States for the cost of navigation and supervision incidental to the transaction.

(h) The grantee is required to pay reasonable charges to the United States for benefits accruing from headwater improvements established and maintained by the United States and for the use of any Government land used in power development.

The bill provides that work must be begun within two years from the date of the permit and completed within such time as may be specified by the Secretary of War, and provides for diligent, orderly, and reasonable development and continuous operation of the water power, subject to market conditions. The bill provides that contracts extending beyond the life of the permit for sale of energy may not be made without permission of the public-service commission of the State in which the water power is located.

The Shields bill is distinctly a compromise measure. It is the product of the long conflict of views and of the efforts of the Senate to deal intelligently with the subject. Like all compromise measures, it is probably not completely satisfactory to anyone, but as a whole it concededly does safeguard the public interests and concededly is fair enough to capital to secure investment in water powers. In my judgment, it is not at all subject to the objections which have been most vehemently urged against such proposed legislation in the past. Consequently it can and should be supported by those who have been chiefly interested in insisting upon public safeguards and also by those whose chief interest has been to secure development of the great resources. It is to be hoped that, in the public interest, this bill may be accepted by both Houses of Congress, be signed by the President, and speedily become a law.

The American Institute of Electrical Engineers intends to devote a meeting before long to the subject of industrial research. The discussion at that meeting should elicit more than usual interest at this stage of the world struggle between autocracy and democracy, because the issue in the struggle largely depends upon the relative effectiveness of co-operative effort, including industrial research.

THE ELECTRICAL DEALER'S PROFITS

BY A. H. HALLORAN

(Double your cost price to find your selling price! Seems startling, doesn't it? Yet it is a fairly good rule for the electrical dealer who does not know his exact cost of doing business, because it is based on the experience of those who do. This is the beginning of a series of articles on current problems that are confronting the electrical contractor and dealer that, it is believed, will prove unusually timely and helpful. The discussion for the next issue will be on "overhead" while for the issue following the important subject of cost accounting will be treated.—The Editor.)

Your selling price must be large enough to care for (1) the delivered cost of the article, (2) the cost of doing business, (3) a living profit on the sale. Of course every dealer knows the cost of an article, most of them know their cost of doing business, but few are making a respectable profit.

Let 100 per cent represent the selling price. Then, according to our arbitary rule, 50 per cent represents the cost price because double 50 per cent equals 100 per cent. This leaves 50 per cent to cover the cost of doing business and the net profit.

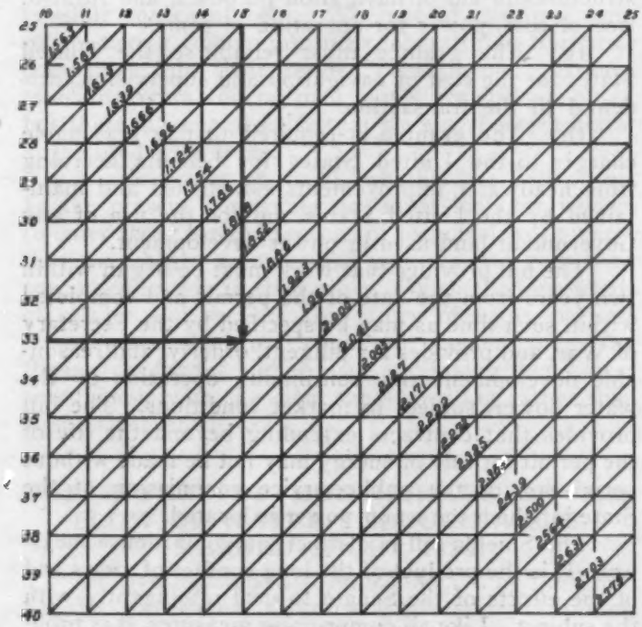


DIAGRAM FOR FIGURING PROFITS

This chart graphically represents the multiplying factors to be used in finding the selling price from the cost prices for various overhead and profit percentages. The horizontal lines show overhead figures from 25 per cent to 40 per cent; the vertical lines show profit figures from 10 per cent to 25 per cent; the diagonal line through the intersection of a given horizontal "overhead" line and a given vertical "profit" line shows the figure by which the cost price should be multiplied to give the selling price. The arrows show an example where the cost price should be multiplied by 1.923 to find the selling price and cover 33 per cent overhead and 15 per cent profit. Conversely if a selling price be found to be 1.923 times the cost price it allows 15 per cent profit with 33 per cent overhead, 18 per cent profit with 30 per cent overhead, etc.

Pacific Coast electrical contractors and dealers have found that the cost of running a retail electrical business varies from 30 to 35 per cent. Where contracting is done on the side the figure is a little lower. Other retail specialty shops have an overhead of from 35 to 40 per cent. So 35 per cent is a safe figure to use. This leaves 15 per cent for profit; $50 - 35 = 15$. Most dealers are satisfied with a profit of 12½ per cent and are handling goods carrying as low as 10 per cent profit. But assuming 35 per cent overhead and 15 per cent profit, it is obvious that the selling price must be twice the cost price.

The accompanying diagram gives multiplying factors to be used in determining the selling price for overheads ranging from 25 to 40 per cent and profits of from 10 to 25 per cent. Merely find the figure at the intersection of the horizontal "overhead" line and the vertical "profit" line. For example, the arrows on the chart show that to get 15% profit with 33% overhead, multiply the cost price by 1.923 in order to determine the selling price. Thus an article costing $1.55 should sell for $3.00 under these conditions.

As the selling prices of many electrical devices used in the home are nationally advertised by the manufacturers, the dealer wants to know how much profit he makes in the sale. For instance, a certain make of floor lamp is advertised to sell at $7.50. It costs the dealer $4.50. As $3.00 is 40% of $7.50, this leaves 40% to cover his overhead and his net profit. Consequently, with 30% overhead the net profit is 10 per cent. In order to find your net profit, merely subtract your overhead from the per cent figure obtained from dividing the selling price by the difference between the selling price and the cost price.

Another way of finding your profit is to divide your selling price by your net price and find the nearest corresponding figure in the diagram which will show the net profit for a given overhead. For example, $7.50 divided by $4.50 equals 1.666, which, according to the diagram, corresponds to 10% profit with 30% overhead.

It hardly seems necessary to call attention to the fact that these profits are figured on the basis of the selling price, and not the cost price. Electrical men recognize the fallacies in using the cost price as a basis for figuring prices. In the first place, there is no profit until the article is sold. All expenses are figured on the basis of sales and in order to be consistent, profits should likewise be figured on the selling prices. Until the sale is made expenses cannot be paid and the profit does not exist.

The actual percentage of profit to be made in each sale is a subject requiring careful consideration. A smaller percentage of profit is allowable on a staple article than on a specialty because the market has already been created for the staple. An investment of one hundred dollars in lamps may be made to turn over twelve times in a year, whereas the same investment in an electric range may turn over but twice. The secret of success in retailing is in carrying a small amount of stock and turning it over frequently. "Business is a tank of profits. Capital is a myriad of sponges. The sponges should be constantly put into the tank one at a time, then taken and squeezed dry."

Figuring stock turnovers is a complicated matter, because a part of the capital invested is released almost immediately and put back into additional stock and a part of it may be tied up for a long time. When capital is invested in stock and all the stock is sold the capital is turned over. But knowing the amount originally invested, the average stock on hand and the total amount of subsequent purchases, the dealer

can figure the number of times he has turned his capital by dividing the cost of goods sold during the year by the cost of the average stock carried. If a dealer finds that with an original investment of $500 and a year's purchases totalling $3,000 he has carried an average stock of $500, his turnover is six times. Thus an electrical man who has $10,000 worth of stock when he takes his inventory needs only to know the amount of his purchases and the average stock on hand to figure the number of his turnovers.

But in order to figure the number of turnovers on his gross business he must first allow for a profit on each turn of his capital before he can know the number of turnovers. Otherwise he is figuring without a starting-point. Suppose a small dealer has a gross business of $10,000, has stock on hand worth $1,000 and averaged the same amount of stock on hand during the year, how many times would he have turned over the stock investment of $1,000? Do not jump at the conclusion that he turned it over ten times without first figuring his profit. Suppose that his selling price had been twice his cost price. One-half of $10,000 is $5,000. So the total stock investment represented in the $10,000 gross was only $5,000. Consequently his capital turned over five times. "You turn your capital over when you sell all the goods you have bought, regardless of the price at which the goods are sold."

Finally, neither the cost of the article and the expense of doing business are the only factors to be used in determining the selling price. The selling price should be that amount which the goods will command in the market,—how much the average customer will pay if he wants the article. Consequently it does not pay to handle an article for which the demand is so weak that it will not command at least the cost, the expense of doing business and a living profit.

AN ARTIFICIAL TRANSMISSION LINE

The long distance transmission of power is a question always of interest in the West where water power is so plentiful. It is often difficult to follow out the problems which arise in the actual working of the line in the field and to be able to bring this work into the laboratory is a real achievement.

In the September proceedings of the American Institute of Electrical Engineers, George H. Gray has interestingly set forth the design, construction and tests of an artificial power transmission line for the Telluride Power Company of Provo, Utah.

A description is given of an artificial power-transmission line which duplicates, in considerable detail, an actual transmission system. Each unit of the artificial line represents about ten miles of the actual line.

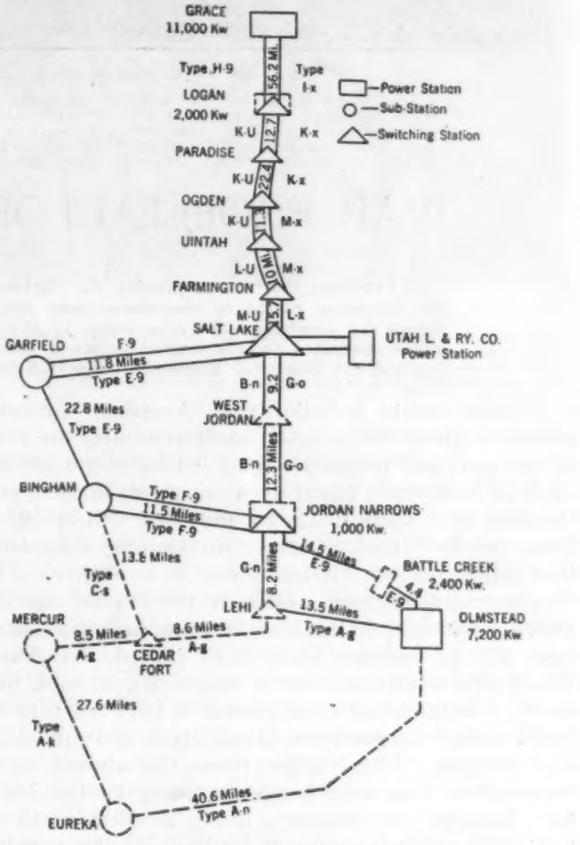
Methods are given of calculating the correct distribution of inductance between self and mutual, and of calculating the correct distribution of capacity between wire and wire, and wire and ground.

It is shown that this artificial system will duplicate very closely, even under extreme conditions of short circuits and grounds, many of the phenomena occurring on the actual system.

A description is given of some oscillographic tests, made on this line, of the magnitudes and phase relations of current and voltage at different points, when the line was subjected to various types of short circuits and grounds.

The data are presented in the form of vector diagrams; one for each point of the line where readings were taken. In addition to the diagrams, arrow-headed lines are shown at each station. These indicate the magnitudes and directions of power flow for each phase (as shown by star-connected wattmeters) and the total power flow.

It is shown that the total power flow is not always toward the short circuit (or ground). Hence, two-



An artificial transmission line

wattmeter principle relays will not always indicate toward the short circuit (or ground) and may sometimes operate the wrong switch.

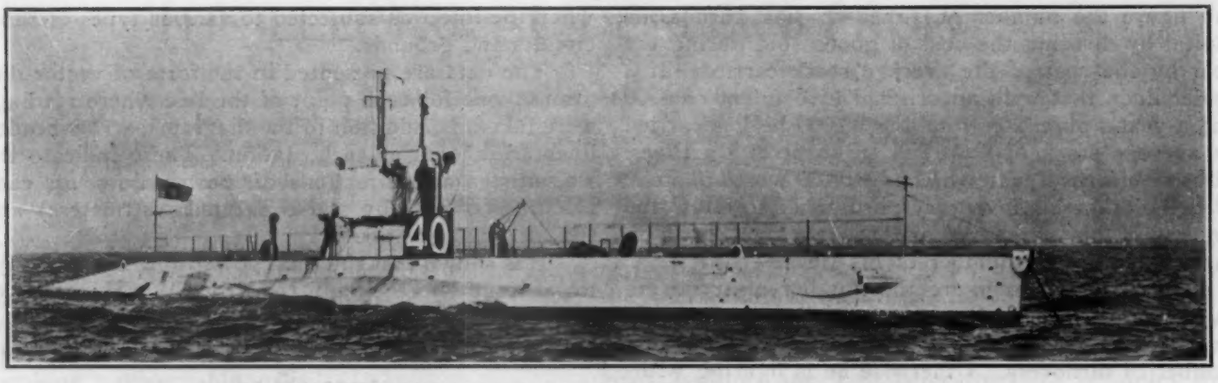
With a three-phase short circuit the direction of power flow for each phase, and consequently the direction of total power flow, is always toward the short circuit.

With a two-wire short circuit, if the phase rotation is A — B — C, and the short circuit is between wires B and C the power flow indication of the B phase wattmeter is, at all stations, toward the short circuit. The wattmeter for the other phases may indicate away from the short circuit.

A ground on a single wire does not appreciably alter the power flow indication of any of the wattmeters, if the neutral is ungrounded.

If the neutral is grounded, the power flow indication for the grounded phase is toward the ground at all points.

If two wires are grounded at the same time, with the neutral grounded, the power flow indications are practically the same as for the two-wire short circuit.



THE U. S. SUBMARINE L-1, ANCHORED IN HAMPTON ROADS

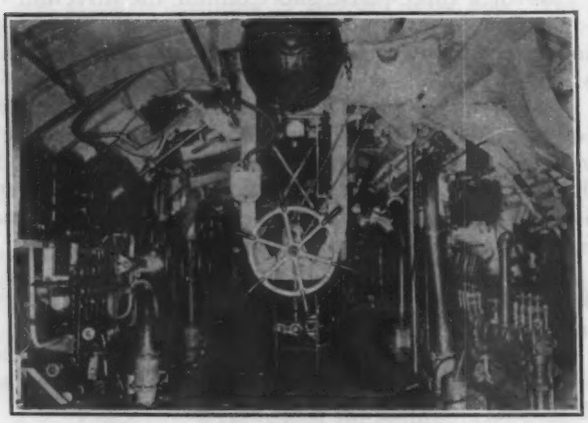
The displacement of German sea-going submarines of this character, which lately have ventured so far afield, is about 800 tons, their surface speed being 18 to 20 knots. These boats carry 10 or 12 torpedo tubes—four ahead and two astern—thus permitting of their discharge in quick succession if necessary. In these boats the breathed air is freed from dioxide by potash and is cooled and re-oxygenated by gas added to it from tanks of compressed air or oxygen. Copyright by International Film Service.

WAR PROBLEM FOR INVENTIVE SOLUTION

BY JOHN D. GALLOWAY

(Problems that are perplexing the National Research Council are herein made known in order that the inventive genius of the nation may set itself to work and assist the council in providing effective means for combating the new issues of the present world conflict. This article is abstracted from a paper presented by the author before a recent meeting of the San Francisco Section of the American Institute of Electrical Engineers.—The Editor.)

There exists a belief that American inventive genius will materially assist in determining the result of the war, and possibly it may. I have considerable faith in Americans but it does not go to the length of thinking that some unknown inventor will spring up from nowhere with a device for sinking submarines that will wipe the Germans out of existence. That idea prevails, however, and after the State Council of Defense had accumulated a collection of letters, drawings, etc. of various ideas, they asked the Pacific Research Council to form a committee to look them over. I suppose we have examined between fifty and one hundred suggestions, ideas, plans and models for war devices. They range from the absurd to the reasonable. One man suggests taking all the 2½ in. fire hose in the country, filling it with grain and towing it to Europe for our allies. If the tow-boat was lost, the hose would float around until picked up by another ship. Another man would load shells with honey bees, which when dropped on the Germans would make their lives unendurable. Still another would station two ships, one at Norway and the other at England, furnish them with powerful electric appliances that would charge the intervening water, and electrocute the submarines. Most of the suggestions sent in are reasonable, but largely re-statements of things already known or tried out long ago. I have no idea that anything valuable will be offered, but in the hope that something good may come we look over everything and sometimes send it on to Washington, where a similar committee does the same work.



INTERIOR VIEW OF A TYPICAL SUBMARINE

Note the comblicated equipment, electrical and otherwise, that is installed in the modern submarine. It is said that a whole year is necessary to properly train a crew to operate the submarine. Copyright by International Film Service.

If Americans invent anything to finish the war it will be in some well-equipped laboratory where men of scientific training are at work. Such work is being done in San Francisco, but I refrain from further information as the gentleman at the head of this laboratory is here tonight to tell his own story.

This brings up another phase of the subject of inventions, and that is, a knowledge of the problems to be solved. Very little information has been given out and so, to a certain extent, inventors are working in the dark. The following is a list of problems requiring solution sent to us by the National Research Council advising the National Council of Defense:

(1) A pipe-pushing device which will ensure the maintenance of the required direction.

(2) A substitute for lead antimony alloy for shrapnel bullets, the alloy consisting of 7 parts of lead and 1 of antimony and the number of bullets being 41 to the pound.

(3) A means of dissipating gas clouds.

(4) Predicting apparatus for Anti-Aircraft gunnery.

(5) Means for removing wire entanglements otherwise than by firing at them.

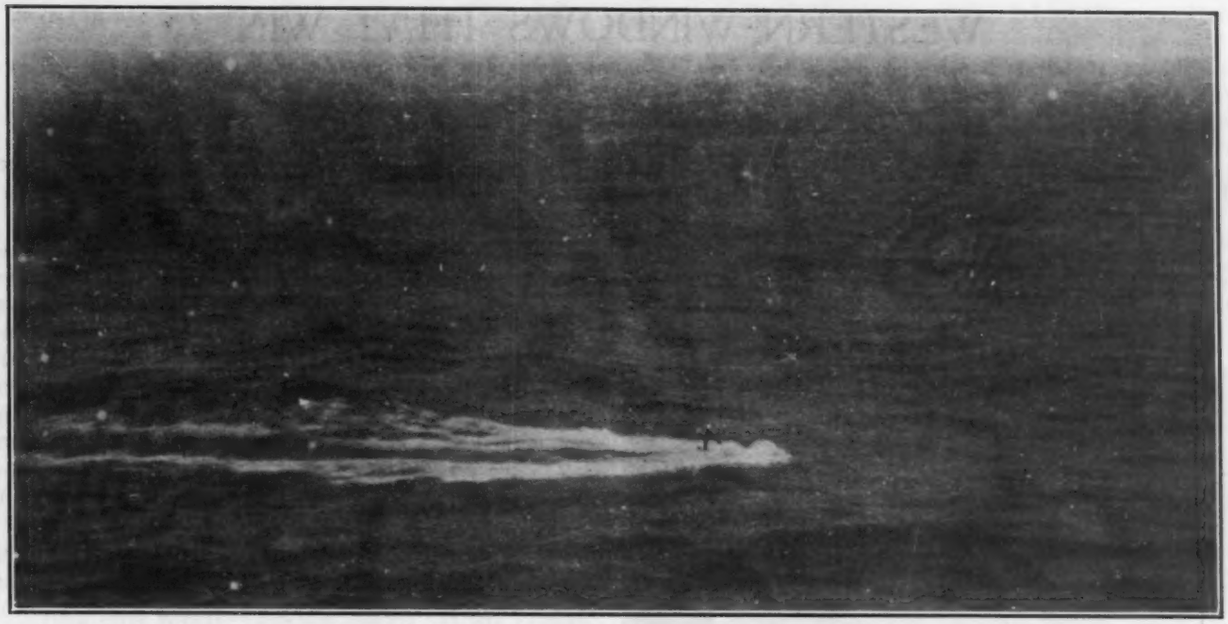
(6) A short base height-finder for anti-aircraft use.

(7) Trench signalling apparatus for signalling back to the trenches from an advanced position.

(8) Message carrying rockets.

(9) Trench signalling apparatus for the transmission of messages which cannot be tapped.

(10) Apparatus for detecting the approach of air-craft by sound.



A PERISCOPE JUST BEFORE SUBMERGING

This remarkable view of the periscope of a German submarine was taken during the attack on the American transports carrying Pershing's expedition to France. According to Admiral Gleaves' report, submarines were encountered on June 26 about midday and again on the morning of June 28. They were driven off both times. This picture was taken from the deck of one of the transports (name suppressed by censor) during the encounter. The submarine was fired on by the naval gun crew as she submerged. Copyright by International Film Service.

(11) Apparatus for the acoustic detection of hostile mining activities.

(12) Armor-piercing bullet for use against tanks.

On receipt of this list, I wrote Dr. Millikan in Washington, asking if it was not possible to send out more detailed information regarding the problems with some statement as to what had already been done. He replied that nothing farther was available, but later Dr. Durand sent us a summary of available information upon the submarine and the torpedo. As these matters are of interest, I have abstracted some parts of these papers, even at the risk of giving information already well known. After tracing the history of the invention, the paper states that the most effective type of modern war submarine has a displacement of 1200 to 1500 tons, a length under 300 feet and a surface speed of over 20 knots.

Larger war submarines, with a length of 300 to 400 feet, are inadvisable because they would be too slow in submerging and when submerging, except at very small angles of inclination, they would run the risk of reaching dangerous depths before they could be controlled—dangerous depths being those at which the nose of the boat may strike bottom or the hull be subjected to crushing stresses, due to a water pressure beyond the strength of the boat.

No submarines have been built to accompany fleets on account of a lack of speed. A speed much greater than 20 knots an hour is necessary. In the United States, the surface displacement is customarily given for submarines; the 1915 type shows a surface displacement of 1200 tons, a surface speed of 20 knots and a submerged speed of 11½ knots. Many of our boats are now capable of making a cruise of about 4500 miles.

The 1915 type is submerged by the filling of water tanks and the operation of two pairs of horizontal or diving rudders, one pair at the bow and the other at the stern. The hull is divided horizontally into nine main watertight compartments. Forward at the bow are the water ballast tanks through which are carried four torpedo tubes, two on the port and two on the starboard bow. Aft of this is the torpedo compartment. The next compartment forms the officers' quarters, and aft of this comes the crew's quarters with storage batteries below deck. Then follows a smaller compartment, the upper part of which is the wireless operator's room, and the lower half is given up to cold storage. Next, at about the midlength of the boat, is the central operating compartment with the conning tower. Aft of this comes another compartment, containing quarters for the crew, and below the floor, as in the case of the other crew's quarters, are storage batteries. Then follows the engine room containing two 12-cylinder engines. In the next compartment are electric motors, two on each shaft; and in this room also is located various auxiliary machinery. The last compartment is given up to water ballast.

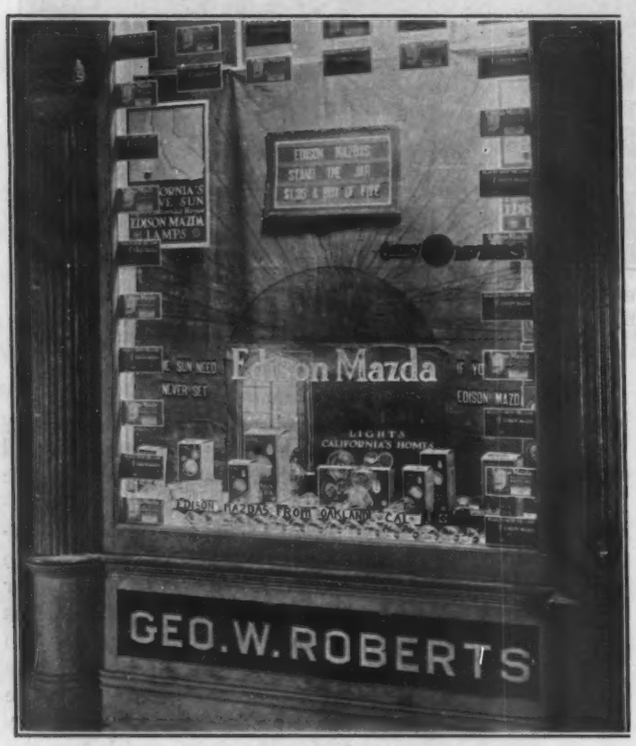
In addition to the four fixed torpedo tubes, there are four tubes arranged in pairs on two movable mounts, which are carried above the main hull and within the false superstructure. These are capable of being fired through a wide arc on either bow.

The 1915 type of German submarine used surface propelling machinery, consisting of two Diesel engines, each developing about 900 to 950 brake horsepower. These engines work on the two-cycle principle, which implies that there is one working stroke per cylinder for every revolution and involves the introduction of scavenging air pumps for supplying air for the working strokes and driving out the exhaust gases after combustion and expansion. In Diesel engines high pressure air compressors are also required to supply compressed air at about 750 to 1000 pounds per square inch, for injecting the fuel into the working cylinders after compression.

WESTERN WINDOWS THAT WIN

("Example is more powerful than precept." To present new ideas in show window display to electrical dealers throughout the West actual displays will be illustrated and described in this department from time to time. The prize winners in the "California Native Sun" contest conducted by the Edison Lamp Works are shown herewith.—The Editor.)

Some excellent examples of effective show window displays were brought out in a contest conducted in California under the direction of Frank D. Fagan, Pacific Coast manager of the General Electric Co., during September, 1915. As the cash prizes totalled $260 the response was wide-spread throughout the state.



First Prize Winner—Geo. A. Roberts, Marysville
A simple, well-balanced display with strong selling argument in well displayed lettering. It combines human interest, novelty and artistic arrangement in a small window.

The object of the displays was to tie in the fact that the lamps are made in California with the spirit engendered by the celebration of Admission day on September 9th and during the week following. Around the central idea that the Edison lamp is a "California Native Sun" was to be built up a structure typifying California conditions.

Each dealer entering the contest was furnished with material and suggestions for a window trim, but was encouraged to use originality as far as possible. One suggestion was a Mission town, surmounted by a cross and supporting bells. The town was to be built up of lamp cartons and the bells and cross cut from white cardboard, as was also the painted orange-colored sun.

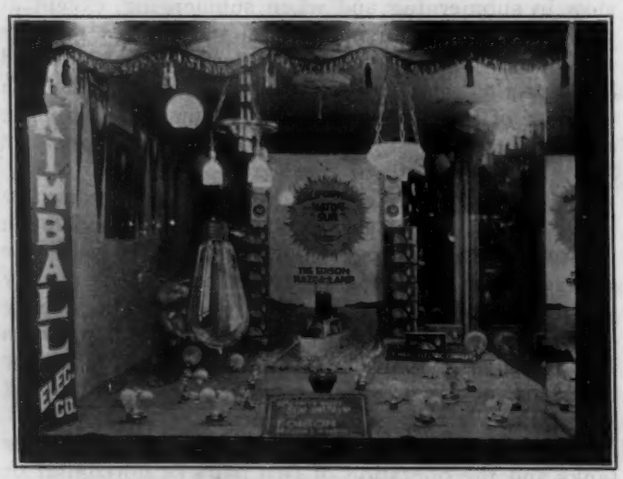
Another suggestion called for an arbor made up of lamp cartons held together by inserting the flaps of one into the other and fastening them with pins. In the background was shown a sun with a Mazda lamp as its center and prominently displayed were posters bearing the message, "California's Native Sun Lights California Homes." Supplementary material in the way of blotters, automobile banners and cuts for newspaper advertising were also furnished so as to attract favorable attention to the dealer's store, thus increasing lamp as well as other sales.

Contestants were advised that merit, not size, would decide the winning windows. The effectiveness of a single central idea simply presented was emphasized and suggestions made to provide some moving object, such as a fan-blown flag, as a means for attracting attention. The premium placed upon originality was also impressed on their minds by means of the literature sent out in advance. They were notified that the contest would be judged from photographs and brief descriptions submitted prior to September 29th.

The judges of the contest were Mr. Allan, secretary of the Western Furniture Dealers' Association, H. C. Reid, president of the California Association of Electrical Contractors & Dealers, and A. H. Halloran of the Journal of Electricity. In determining the prize winners the several criteria set by the company were kept in mind as well as the selling power, novelty, balance, lighting, artistry, and judicious use of show cards.

The accompanying illustrations show the prize winners. The first prize of $100 was won by Geo. W. Roberts of Marysville, the second of $75 by Kimball Electric of Oakland, the third of $50 by Hanbridge Electric Co. of San Francisco, the fourth of $25 by the Valley Electric Supply Co. of Fresno and the fifth of $10 by the Levy Electric Co. of San Francisco.

The background of Mr. Roberts' window was painted to represent the setting sun, with the wording, "The Sun Need Never Set If You Use Edison Mazdas." The window display material was used to convey the idea that Edison Mazdas are California's Native Sun, while the moving train brings out the fact that the Oakland factory is busy making delivery of Edison Mazdas, as each car carries a lamp. In the opinion of the judges this window would probably sell more lamps, other conditions being equal, as it



Second Prize Winner—Kimball Electric Co., Oakland
A window embodying novel ideas effectively carried out. It invites attention but is lacking in direct selling arguments.

gave the price of a carton in a prominent position and carried an active buying suggestion. The moving train of lamps embodies a feature of strong human

Third Prize Winner—Hanbridge Electric Co., San Francisco
An artistic effect obtained with small cost. Increased lamp sales 25 per cent in one week.

interest, the display is simple and well-balanced and the use of well-worded cards should help in selling lamps.

The central feature of the Kimball Electric Co. window was a battle-ship fabricated from Edison Mazda lamps, the hull being made of tubular lamps wired on a cardboard frame, the smoke-stack of heater bulbs and the guns of tubular lamps made of paper. The bear at the side held the ribbons by which the ship was fastened. Various types of lamps were well-displayed in the foreground. This window has good attention-compelling value but does not carry quite as strong a selling argument as does the window of the first prize.

The Hanbridge Electric Co. greatly improved on the suggestion of a California mission by clever elaboration. The cartons of which it was constructed were given the yellow tint of adobe while the doorway and window sills were tinted reddish brown. A blue cardboard background carried a yellow cardboard sun and a giant lamp as well as appropriate signs in 4-in. white letters. Grass sod, geraniums and palms gave an appropriate setting for the mission and the lamps which varied in size from flashlights to 1000 watt mazdas. The total cost of this display to the contractor was $2.20, During the first week sales increased 25% as a result of the display.

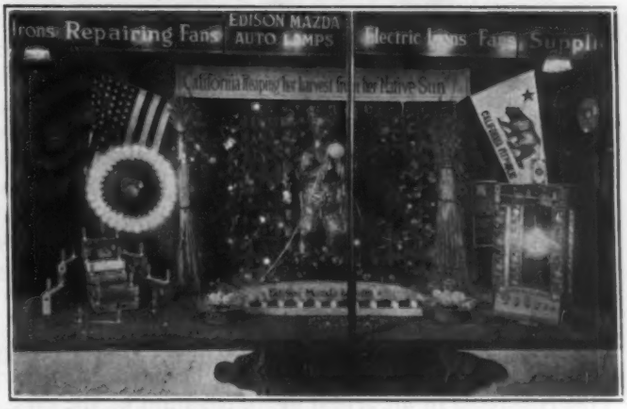
Fourth Prize Winner—Valley Electrical Supply Co., Fresno
Great originality in arrangement and wording of placards. Special appeal to those interested in home products.

For originality of conception and cleverness of execution the window of the Valley Electrical Supply Co. is deserving of special mention. The display of harvest products is particularly appropriate in an agricultural community. In the words of Stuart Rogers, who designed and built this window:

"In the center we have 'A Winning Wonder.'

"The setting Sun on yonder hills,
Which gives the days their light;
Its work is done, its toil is o'er,
It's failing fast in downward flight;
You step inside and buy the Sun,
That drives away the falling night.

The setting sun in the evening scene is worked by the sign flasher, giving the disappearing effect, and then you will see a 1000 watt light in the center of the window, below the words 'California Edison



Fifth Prize Winner—Levy Electric Co., San Francisco
An artistic arrangement, novel in design, but lacking balance. Descriptive price tags are a good feature.

Mazda.' That stays on for a few moments and then the red, white and blue flashes its colors on the scene. The large sign at the top of the window, 'California Native Sun,' is in red, white and blue paint."

"California Reaping Her Harvest From Her Native 'Sun,'" the keynote of the Levy Electrical Co. display, brings out the fact in an attention-compelling manner that the Edison mazda lamp is a California product. The state colors of blue and gold were used throughout. The lattice work was finished off with California poppies, oak leaves, and fruit and flower lamps. The sheaves of grain conveyed the idea of "California Reaping Her Harvest" from the Edison mazda lamp. Blue and gold streamers ran from the words "California and Native 'Sun,'" in the large card to the 750 watt nitrogen lamp. The signs were arranged to read consecutively and bring out "Home Industry" to the reader. Between the two lower signs was a row of lamps comprising all the standard sizes with a price and descriptive tag attached. To the extreme right was a chapel with a 300 watt nitrogen lamp representing a bell which is pulled by a man below—a gold cord suspending for a rope.

SELLING ELECTRIC WASHING MACHINES

BY A. E. KUHNHAUSEN

(The department store may be made an effective medium in selling appliances to women. The details of a successful campaign conducted along these lines in Oregon are given in this article. The author is sales manager of the Lipman-Wolf Company of Portland, Oregon.—The Editor.)

When it is possible to sell 100 electric washing machines in 6 weeks' time through a department store, it is of general interest to the electrical fraternity to know how it was done.

The machine was a moderate priced machine, retailing at $65.00, and was sold at $1.00 down and $1.00 per week, being placed on a thirty day trial. If at the end of that time it did not prove satisfactory the machine could be returned and the money would be refunded. Out of the first one hundred machines sold not a single one had to be taken back.

The writer conceived the idea that a campaign for selling electric washing machines could be conducted with great success and at a small expense through the medium of a department store, for the following reasons:

(1) The general public, especially the women in the larger cities, are accustomed to buying from department stores, and also to looking through the department store advertisements which appear in the daily papers.

(2) A small advertisement in the columns devoted to the department stores has a greater drawing power than the small-sized ad. for a local electrical contractor or dealer.

(3) The location of a department store is always the correct location for merchandising.

Therefore in line with these reasons the campaign was started by a special section in the department store ad. page in the daily press. Also a window display was arranged which proved to be most effective. This consisted of an actual demonstration of the electric washing machine by a woman on one side of the window space, while on the other side another woman washed in the old-fashioned way. The window also contained a number of suggestive cards, such as "$1.00 down and $1.00 a week will place this wonderful machine in your home"; "The machine will pay for itself"; "Make arrangements for a free demonstration in your home"; "It costs only two cents (2c) an hour to operate the washer," etc. Another card directed the interested parties to the first floor where a first-class salesman explained the machine and made appointments for free demonstrations in their respective homes.

It was found that nearly all classes of people bought machines at the above mentioned price. The washing machine of this price is a dolly-type of washer, the machinery being of necessity as simple as possible, so that it will not give trouble to the operator.

These 100 washing machines were sold in six weeks' time by one salesman and one demonstrator. The man who demonstrated in the home thoroughly understood the machine and all possible tricks for washing clothes and at the same time had the necessary ability to close sales.

Prior to visiting the home, the demonstrator would ask the housewife to soak the clothes over night in cold water, which made the washing very much easier and quicker. Upon his arrival in the home he would give complete instructions how to operate the machine, how to take care of it, how to oil it, and how to wash and wring the clothes. In order that the customer would not catch her fingers in the wringer, he explained to her how to handle the clothes in order to avoid getting injured.

In every case, the demonstrator would wash and wring one tub full of clothes and would then let the customer wash and wring another under his supervision, so that by the time her washing was complete she would thoroughly understand all principles in the handling of the machine.

The great secret of keeping electric washing machines sold is the ability to give proper service to the customer.

The practice of calling upon each customer about one week after purchase and demonstration, to ascertain if she had had any difficulties with the first washing she attempted after the demonstration, was found to give excellent results. If a complaint was made, it was taken care of by the man who demonstrated the washer, as it was found that the housewife already had confidence in him.

The few complaints received were adjusted as soon as possible after they were received. They generally consisted of very minor troubles, such as getting the clothes stuck in the wringer or the blowing of fuses. It was found by actual experience that when first-class service is given customers, that each satisfied one will make from three to five additional sales for the store.

At this date the machines are still selling at the same rate as for the first 6 weeks and this with only newspaper ads. and the personal work of the above mentioned sales force.

THE GOVERNMENT DOES ELECTRICAL ADVERTISING

The slogan, "Food Will Win the War — Don't Waste It," is being blazoned in every large city in the country on immense signs on public buildings, according to the Signs of the Times. These signs are uniform in general design, in paint for day time display and illuminated by electric light for night.

Advertising companies have patriotically contributed their resources without charge to install the signs. The Treasury Department has granted the right to use the exteriors of Federal premises in the principal cities, including post office buildings, which are under its charge. Mayors and municipal councils are permitting the messages to be placed on city halls. Electric light companies are gratuitously furnishing and installing the bulbs and supplying the power.

EFFECT OF LOSSES BY FORTUITOUS EVENTS

BY C. E. GRUNSKY

(In discussing losses resulting from fortuitous events of a character against which protection by insurance is not obtainable, the author sets forth in this article many new ideas for consideration by valuation engineers. This discussion was largely brought out by the author in his testimony in the San Francisco Gas & Electric rate-case now on trial in San Francisco before the Mastery in Chancery in that city.—The Editor.)

Losses of magnitude which result from floods, earthquakes, volcanic eruptions and the like and in general, losses against which the owner can not insure, belong to a class of sacrifices, which like those due to obsolescence should be made good to the owner of the utility after the event, by the public, that is to say, by the rate-payers. Such losses can not be forecast. They should not fall entirely on the owner of the utility. In some fashion and to a fair extent, they should, in the course of time, be amortized out of earnings. As a rule no provision for other than ordinary risks is made in the allowed rate of return. Consequently, after a catastrophe, for which the owner is not responsible, but which entails a large investment of new capital to rehabilitate a public utility plant, there should be some provisions for amortizing the loss. It will, in such event, be better to let the amortization take place within a reasonable time rather than to carry an equivalent sum in the rate-base as though it were a permanent though unproductive, interest-bearing investment.

It will perhaps be claimed, by some, that such losses should not be differentiated from the ordinary losses due to unforeseen causes, and that whatever hazard is involved in any enterprise has unqualifiedly been assumed by the owner of the utility. Under such a theory the allowance for hazard should at all times be liberal enough to compensate the owner for the chance which he takes of at some time suffering material loss. He would be compelled to take the gambler's chance and the rate-payer should stand the higher rate. Under such a practice there would be an owner here and there who would suffer large loss, while the great majority of owners, escaping the great catastrophes, would get what really should be paid, in the exceptional case, to the unfortunate owner. Under such a treatment of this matter, the tax for the risk would fall upon those who are paying rates before a catastrophe occurs, as well as upon those who receive service from the rehabilitated works. The more logical procedure would be to relieve the rate-payers from the burden of making the inadequate provision for catastrophes which may never occur and letting the loss that actually results from a catastrophe be met out of future earnings. The usual provision for meeting losses which result from such fortuitous events as are here under discussion, is inadequate. The owner does not, as in the case of losses which must be made good by assurance companies, get the full benefit of the allowance for risk which is distributed in small measure or is at least supposed to be distributed among all public utility owners and is supposed to be collected in the earnings. The owner's share in this risk allowance is only a proportionate one while the loss, when it occurs, can not be distributed to the other utilities of the country which escape such loss, but falls in its entirety upon the one utility that may be affected thereby.

In recognition of the fact that most utilities escape such losses, the usual allowance in the public utility rates for the element of risk is small and probably in most cases negligible. The allowance for management, for business hazards, together with the allowance for participation in the general prosperity of the country, in short the profit allowance, would probably in few, if any cases, be materially reduced, if this element of risk were entirely eliminated.

In all cases in which this interpretation of the present day procedure is substantially true, it would be unfair to an owner whose public utility plant sustains material damage by flood, by earthquake or by other fortuitous event, against which insurance is impossible, to let the entire loss fall upon him without recourse. That such losses should in some way ultimately fall upon those who are served by the utility seems self-evident. The most equitable procedure would be to let them be borne by the rate-payers future. But as they can not be foreseen the practical alternative would seem to be to let them fall in the before the event as well as by the rate-payers of the future as would be the case if the utility were publicly and not privately owned.

In the case of a business not subject to regulation the opportunity to make up for past losses exists if larger profits can be made by charging what the traffic will bear. Owners of public utilities should be allowed to recoup their losses, if they can do so without charging rates unreasonably high.

ELECTRICITY IN HAWAII

Electric light is used in the larger cities, on each of the islands, such as Honolulu, island of Oahu; Hilo, island of Hawaii; Lihue, island of Kauai; and Wailuku and Lahaina, island of Maui. Each of the smaller towns throughout the islands happens to be the headquarters of a sugar-cane plantation, and as the mills all employ electricity for power and light in the plants, while offices and homes also are served, the service is extended to the small towns.

In Honolulu there is one electric-lighting corporation and a Territorial Government light plant, the latter being in Nuuanu Valley, where power is generated by water supply from reservoirs passing over wheels. This current lights most of the streets of the city and also furnishes light for Government buildings. Many of the large buildings in Honolulu have their own electrical plants, as well as water plants supplied by artesian wells on the premises.

One electric -trolley company in Honolulu operates an up-to-date line throughout every part of the city and suburbs. The cars were made in Philadelphia and St. Louis. A street railway system is to be operated in Hilo, a franchise having been granted for that purpose.

SHORT JOURNEYS IN PACIFIC LANDS

(From the "cow to the cup" method in Guatemala to a meal at one of the luxuriously appointed hostelries of Hawaii is a far cry, but the engineering traveller must be prepared to take things as they come. Reports from Alaska and from Russia indicate the growing opportunities for the electrical industry which are opening up there.—The Editor.)

A COMMERCIAL AND ENGINEERING TRAVELER IN GUATEMALA

BY J. W. FINCH

A Street Scene in Guatemala

GUATEMALA, the capital of the Republic of the same name, is connected with both the Atlantic and Pacific coasts by rail and while the city is not at all modern, the traveler can find there, comfortable lodgings, indifferent food and some amusement. However, to really know Guatemala and her people, their customs and their mode of living, one must travel through the interior.

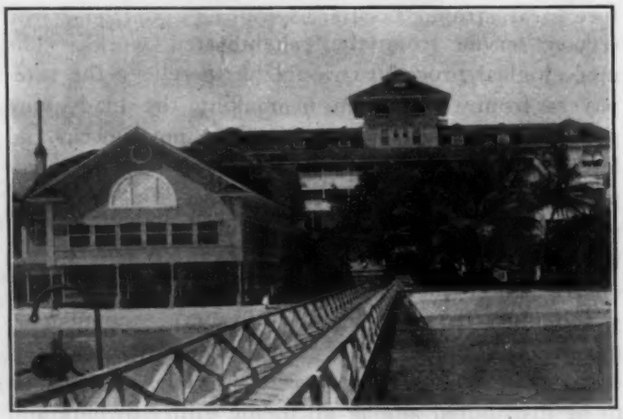
The 100,000 inhabitants of Guatemala City include people of many classes and not a small proportion of them are foreign to the country. The most progressive merchants and those enjoying the largest volume of business are invariably foreigners. There are the legations of the many countries of the world represented here, with their ministers of various and sundry caliber, the ministers' secretaries and clerks and the many consulates with their organizations sometimes consisting of the consul only, but more often with a vice-consul and one or two clerks. The small merchant is usually a Guatemalteco and his establishment may consist of a fairly decent looking store or a stand on the street with all manner of intermediate stores. Next we have the Indian merchants who sell the wares of the country. Some of the Indians will be peddlers carrying their wares through the streets on their heads or backs, others will spread their wares out on the streets, or on the sidewalks, wherever the room will permit. They sit on their heels or squat, beside their shops "al fresco," and patiently await trade. The open air "restaurant" with its charcoal fire in a five gallon kerosene can will serve a very satisfactory meal, from the Indian's point of view, for from 12 to 16 reales (about 3¾ to 5 cents American gold). Their plates consist of a fresh green leaf and their cups usually a small gourd. Some of these "restaurants" are slightly more modern and up-to-date and serve their patrons in a white enamel bowl or plate. If you wish to regale yourself with a glass of nice fresh cow's milk, there are "lecherias de pie" where if you bring your cup or glass you can watch the "lechero" draw the glass of milk directly from the cow. You are thus assured, even though the vendor does not keep a refrigerator that your milk is fresh. But, we are going into the interior and we must start or we will be at the end of our space.

A commercial traveler covering the "Occidente," as all the country west of the capital is called, will leave the city in the early morning by the narrow gauge train of the Ferrocarril International de Central America. This railway system is owned principally, and operated by, American interests and the higher resident managing officials are Americans. A reasonably accurate schedule is maintained and a first class ticket entitles the holder to all the comforts of a cane-upholstered seat in a car which very probably had served a useful term on some one of our Western narrow gauge railroads. The one in which I am riding, while this is being written, was manufactured in Oakland, California, as indicated by the maker's name on the door sill.

WATERING PLACES FOR THE ENGINEER TOURING THE ORIENT

The term "watering places" as applied to the Far East as a nomenclature for the well equipped hostelries there to be found, is well taken and then again it isn't. So far as the beverages that may be obtained are concerned, water usually comes last on the list, but on the other hand so far as keeping one's equilibrium is concerned in a hot, torpid, humid climate, total abstinence is absolutely imperative.

Be this as it may, the engineer who takes a farewell dinner at the Palace or St. Francis in San Francisco immediately before embarking for the Orient, and who expects to bid adieu to carefully appointed menus and well equipped hostelries for many a day, finds himself most agreeably disappointed, as he visits in turn Honolulu, Yokohama, Tokyo, Kobe, Kyoto,



THE MOANA HOTEL AT HONOLULU

In full view of the many colored tints of the coral sea and of the native surf riders excitingly being hurled shoreward, this hostelry presents many surprises in appointments and entertainment not to be found in our great American hotels of this nature.

Nagusaki, Manila, Hong Kong, Shanghai, Peking and other great cities of the Far East.

General Comparisons with Hotels of Southern Europe.—Each in its separate and unique way springs new charms to the traveller's keen desire for something in keeping with the change in national life and environment, and yet at the same time bears sufficient relation to the accustomed American and European methods, as not to frighten the possibilities of perfect action of one's digestive apparatus. Tourists returning from Italy, Greece, Palestine, and Egypt report that this state of affairs is no longer true in that section of the world. Due to the schools and colleges for the training of hotel domestics in Germany, a horde of their graduates have overrun those countries. While their cuisine is excellent and the accommodations usually are beyond reproach, still the eternal "sameness" one experiences from port to port spoils the former charm they possessed.

Hotels of Honolulu are Tantalizing in Their Balmy Beauty.—In the Far East, however, no such dominating influence is felt. As soon as one catches sight of the beautiful Moana and Alexander Young Hotels, as he is about to complete his six day trip from San Francisco to Honolulu, the charm is felt.

The Hawaiian youths—brawny and brown—who swim out to give you welcome and incidentally dive for any coin you may toss to them, act as a kind of new and fascinating appetizer in this land of soft and soothing scenery.

The hotels of Honolulu are located near the enchanting Waikiki Beach and from the beautifully appointed dining room of the Moana Hotel, one may look out upon the alluring coral ocean with its tantalizing greens, blues and purples, to see the native surf rider triumphantly ride the waves into shore.

The service is excellent, the music soothing, the curios to be purchased in the halls of rare taste and reasonable price, and withal one leaves again upon his departing steamer with considerable regret, for there comes to his consciousness a fear that surely now the last farewell has been said to appetizing plate and bed of comfort for many a day.

Only to be fooled again, however, for his next stop is to be at the delightful Grand Hotel of Yokohama.

ELECTRICITY IN THE MINES OF ALASKA

BY ALLEN E. RANSON

Mr. A. L. McConnell, formerly of the Seward Peninsula Light and Power Company of Nome, has taken over the management of the Cordova Power Company and they are making many extensive improvements, adding a new 150 kva. 2200-volt generator which will be driven by a Pelton Water Wheel.

Mr. Angus MacDougal is the resident manager and original locator of the Chitina Kuskulana Copper Company and they have installed a 100 h.p. steam plant on the banks of the Kuskulana, just below the glacier. They have a most complete plant supplied through A. H. Cox & Company of Seattle, consisting of a 100 h.p. wood-burning boiler, a 100 h.p. Erie Ball engine belted to a 62½ kva. G. E. 3-phase, 60 cycle, 2200-volt alternator, switchboard, etc. They have built a three-mile transmission line of stranded galvanized steel cable which runs up the mountain below the opening of the ore tunnel, about 1500 feet above the river. Here they have installed an Ingersoll Rand Air Compressor driven by a 50 h.p. motor.

They are installing a new 165 h.p. Diesel engine and 100 k.m. a.c. generating plant at Ellamar. The mine is owned by Mr. F. M. Jordan of Seattle and is a most successful copper property.

I note that many properties are installing Diesel fuel-oil engines. Mr. Hancock, manager of the Mother Lode Copper Mine, has a 150 h.p. and the Kennett Copper Company at the mine has one. Grassby is putting in a new 200 h.p. and all along the line it seems to be the favorite auxiliary.

GROWTH OF ENGINEERING AND COMMERCIAL RELATIONS WITH RUSSIA

The following table shows the growth of the United States' export to Russia before the war, according to United States statistics:

U. S. Yearly Average Export to Russia (In Thousands of Dollars)

	1891-1895	1896-1900	1901-1905	1906-1910	1911-1913
Cotton (raw)	4,811.0	3,006.0	5,909.0	5,478.0	5,685.5
Agricultural machinery and implements)	323.4	684.4	3,000.0	5,178.0	1,322.7
Copper (unmanufactured)	.....	822.0	1,632.0	1,112.0	1,322.7
Wheat flour	136.0	395.0	773.0	1,895.0	3,360.0*
Leather (prepared)	.....	1.3	1.8	162.0	1,075.3**
Machine oil and paraffin	1.0	9.1	71.1	151.2	232.8**
Rosin	241.0	285.0	275.0	320.0	737.0
Typewriters	.....	126.1	172.7	367.8	846.9
Cash Registers	.....	.....	26.0	124.0	249.4**
Sewing machines	.....	28.1	36.3	232.9	768.3**
Scales of every kind	29.4	70.5	54.0	57.0	58.6**
Twine, cord, etc.	11.7	28.5	299.9	753.0	1,646.4

*This is the figure for 1911. No figures are given for 1912 or 1913.

**Figures for 1913.

The figures just quoted, together with the figures quoted previously regarding Russia's export to the United States, show quite clearly along what lines the American-Russian trade rapprochement had begun to develop even before the war, before the remarkable changes produced in the economic situation of both countries. Russia supplies and will supply this country with raw materials of the highest quality. The amount of Russian raw materials brought to this country is much greater than can be seen from Russian or even United States statistics. By creating direct connections with Russia, by careful study of the conditions of the Russian market, by an active trade policy, the amount of raw materials brought to the United States from Russia can be multiplied many times to the benefit of both countries.

On the other hand, the United States supplied and will supply Russia with all kinds of machinery, with all kinds of products that presuppose a highly developed industrial culture. The possibilities of such trade, very apparent before the war, are emphasized by the events of the war. Germany, which in 1913 held 52.6 per cent of all Russia's import, is now withdrawn from the field. By proper and active policy, the United States can now not only develop that line of her trade with Russia that showed a natural tendency to develop before the war, but even introduce into the Russian market a full line of goods never before brought into Russia from the United States.

RECENT ADVANCES IN WESTERN WATER LAW

DEPARTMENT CONDUCTED BY A. E. CHANDLER

(This decision settles the long standing controversy between the Silver Lake Power & Irrigation Co., one of the projects of the Nevada-California Electric Corporation, and the city of Los Angeles, in favor of the city. So succinct is the wording and so clean the statement of principles that the decision is printed in its entirety. It was writen by J. Henshaw and unanimously concurred in by all the justices of the California Supreme Court.—The Editor.)

SILVER LAKE—LOS ANGELES AQUEDUCT DECISION

Respondent's predecessors in interest first conceived the plan of utilizing the waters of Owens river and of Rock Creek, one of its tributaries, for irrigation and for the development of hydro-electric energy. They made locations upon the river and creek for these purposes. They began their work under these locations and they prosecuted this work until it was interrupted and suspended by withdrawal orders of the government of the United States. Under the compulsion of these withdrawal orders the predecessors in interest of respondent ceased work. These withdrawal orders were temporary in character and made in conformity with the law in contemplation that the United States government might itself impound these waters and devote them to purposes of irrigation for the benefit of the valley lands lying under them. This contemplated reclamation scheme of the federal government was abandoned. Before the formal order of abandonment was actually made it became apparent that the government would not proceed with its plan, and respondent's predecessors in interest resumed work. The work which they did before the withdrawal of these lands by the government was performed at least two years before the city of Los Angeles ever contemplated using the water of Owens river or of its tributary, Rock creek, for any purpose whatever. During the period of time when the lands lay under the orders of withdrawal Congress passed a certain act, giving the city of Los Angeles, upon conditions, a preferential right to purchase some of the withdrawn lands. The orders of withdrawal, to which reference has been made, were first, the order of July 24th and 27th, 1903, under which all of the lands on which the notices of appropriation by respondent's predecessors in interest had been posted, were temporarily withdrawn, together with large tracts of land for use as a reservoir site in connection with the contemplated government project. On August 24th and 25th, 1903, all the lands upon which it was proposed by respondent's predecessors in interest to put the water for agricultural purposes were temporarily withdrawn from all forms of entry except homesteads. On January 1, 1905, all the lands in the Owens river gorge, which lands lie below the proposed reservoir site, were likewise withdrawn for use in connection with the government project. These orders of withdrawal were formally vacated on July 12, 1907.

Before June 30, 1906, but long after the initiation by posting and recording of the rights of plaintiff's predecessors in interest, and long after their first work under those rights had actually been prosecuted, the city of Los Angeles conceived the idea of devoting to its own uses for municipal purposes the waters of Owens river. On the last mentioned date and during the period of the operation of the orders of withdrawal above referred to, Congress passed an act (34 U. S. Stats. at Large, p. 801), granting to the city of Los Angeles necessary rights of way over the public lands in certain named counties "for the purpose of constructing, operating and maintaining canals," etc., in short, for all legitimate purposes in connection with the proposed conduct of the water of Owens river to the city of Los Angeles, and for the additional purpose of maintaining power and electric plants. This grant was to take effect "whenever said city shall have filed, as hereinafter provided, and the same shall have been approved by the Secretary of the Interior, a map or maps showing the boundaries, locations and extent of said proposed rights of way." It was required that the city should file such maps within one year after the passage of the act, and should do no work until the maps had been filed and approved. The rights of way thus tendered by grant were declared not to be effective "over any land upon which homestead, mining or other existing valid claims had been filed or made until the city of Los Angeles shall have acquired title thereto and made just compensation therefor." Still further and with particularity it was declared that the act should not "affect the adjudication of any pending applications for rights of way by the owner or owners of existing water rights, and that no private right, title, interest or claim of any person, persons or corporation in or to any of the lands traversed by or embraced in said right of way shall be interfered with or abridged." Also the act declared:

"That in the event that the Secretary of the Interior shall abandon the project known as the Owens river project for the irrigation of lands in Inyo county, California, under the act of June seventeenth, nineteen hundred and two, the city of Los Angeles, in said State, is to pay to the Secretary of the Interior, for the account of the reclamation fund established by said act, the amount expended for preliminary surveys, examinations and river measurements, not exceeding fourteen thousand dollars, and in consideration of said payment the said city of Los Angeles is to have the benefit of the use of the maps and field notes resulting from said surveys, examinations, and river measurements, and the preference right to acquire at any time within three years from the approval of this act any lands now reserved by the United States under the terms of said reclamation act in connection with said project, necessary for storage or right of way purposes, upon filing with the register and receiver of the land office in the land district where any such lands sought to be acquired are situated a map showing the lands to be acquired, and upon the approval of said map or maps by the Secretary of the Interior and upon payment of one dollar and twenty-five cents per acre to the receiver of said land office title to said land so reserved and filed on shall vest in said city of Los Angeles."

It was the language of this act, with other circumstances not necessary to particularize, which conveyed the knowledge that the government would abandon its proposed reclamation project. Thereupon respondent's predecessors in interest in June, 1906, resumed work under their notices and continued this work (interrupted only by the snows of winter) until shortly after the commencement of this action on July 15, 1907. At that time there was in the codes of this state a section (Civ. Code, sec. 1416) providing in effect that where litigation becomes necessary under such enterprises as this to acquire land or rights, "then the party so appropriating, or his assigns, shall have sixty days after the determination of legal proceedings by final judgment in which to commence to excavate or construct the works in which he intends to divert the water." Respondent and its representatives ceased work under the guaranty of protection extended by this law. Its provisions in this regard, however, were repealed, at least by implication, by section 4 of the Water Power Act of April 8, 1911 (Stats. 1911, p. 813.) Following the passage of this act, on or about August 1, 1911, respondent resumed work and continued this work until the date of the trial of this action. This latter work was in part actual construction work and in part was surveying.

In the action which it brought, this respondent set up its asserted rights to the waters of these streams for the purpose of irrigation as well as for the purpose of developing hydroelectric energy. In this another corporation was interested. There resulted a tripartite agreement between these appellants and respondent and the third corporation, under which the asserted right to the use of the water for purposes of irrigation was abandoned and those rights conveyed to the city of Los Angeles, leaving in issue the question whose was the right to use these waters for the generation of electricity. With the litigation thus restricted trial was had before a jury, to which twelve special questions were submitted. One and all the jury's answers favored plaintiff's contentions. The court adopted them and incorporated them into the findings which it made. Upon these findings and the legal conclusions drawn therefrom it gave judgment for plaintiff and the defendants have appealed from that judgment and from the order denying their motion for a new trial.

This statement, incomplete in itself, is designed only as an aid to an understanding of the single question necessary to be considered on this appeal. That question may be thus stated:

What effect upon the original appropriators' rights was worked by the executive orders of withdrawal and the act of congress operating with the laws of this state?

As its answer necessitates the construction of federal laws, the interpretation which the United States has put upon those laws is of all controlling force. The federal law under which the original locators were admittedly acting is that found in section 2339 of the Revised Statutes of the United States, approved July 26, 1866. Notwithstanding its familiarity, it may be well to quote it in part:

"Whenever, by priority of possession, rights to the use of water for mining, agricultural, manufacturing or other purposes have vested and accrued and the same are recognized and acknowledged by the local customs, laws and the decisions of courts, the possessors and owners of such vested rights shall be maintained and protected in the same; and the right of way for the construction of ditches and canals for the purposes herein specified is acknowledged and confirmed."

It is to be noted that the "rights" which are dealt with are, first, rights which have "vested and accrued." and, second, rights which are recognized as such "by the local customs, laws and the decisions of courts." Conceding that the work done up to the time of the suspension of it under the withdrawal orders was sufficient to fulfill the requirements of our state law (Civ. Code, secs. 1415, 1416) it is undisputed that this work was not completed. The first legal question, then, is what is the nature of the rights which the original locators had acquired up to and at the time of the enforced suspension of work under the withdrawal orders? Our cases fully answer this question. As against all the world but the United States there was acquired a possessory right to continue with diligence the prosecution of the work until completion. "Such visible act (of possession accompanied by work) and avowed intent (to prosecute the work adequately and diligently) gave him a conditional right to the future use of the water prior to its actual use, the condition being that he should thereafter diligently continue the work to completion and then divert the water and apply it to a useful purpose, failing which his right would cease. Upon the performance of this condition the title to such use would become complete and perfect. In the meantime, however, he had an existing conditional right, manifested by actual visible possession of the works. It would be clearly a property right, and it being incidental and appurtenant to land, it was real property. (Civ. Code, sec. 658.)" **(Inyo Cons. Water Co.** v. **Jess,** 161 Cal. 516.) To precisely the same import is the later case of **Merritt** v. **City of Los Angeles,** 162 Cal. 47. In both of these cases this court was discussing the attempted interference with one who was or claimed to be in possession of the public domain under notices of appropriation, and who was or claimed to be in diligent prosecution of the work as against the hostile claim and interference of a **private third person.** That the law was thus declared by these decisions is unimpeachable in point of soundness may not, we think, be successfully questioned. The property right is not dissimilar to that which this court declares belongs to the locator of oil lands, in peaceable and in diligent prosecution of work seeking a discovery of oil, before the discovery is actually made. Such a locator, we have held, has a possessory right which is property, and which he can maintain in the courts against trespass or hostile private claimants. **(Miller** v. **Chrisman,** 140 Cal. 440; **Weed** v. **Snook,** 144 Cal. 439.) But none of these cases, considered, for their exigencies did not call upon them to consider, the character of the rights thus obtained as against the paramount authority, the government of the United States. But we are not without positive pronouncement from the Supreme Court of the United States upon this precise question. In **Bear Lake Irrigation Company** v. **Garland,** 164 U. S. 1, the section from which we have quoted came before the court and received careful analysis. From the opinion of that case we quote at length, as follows:

"So far as the public land is concerned, over or through which these ditches for the canal were dug, the statutes above cited create no title, legal or equitable, in the individual or company that simply takes possession of such land. The government enacts that any one may go upon its public lands for the purpose of procuring water, digging ditches for canals, etc., and when rights have become vested and accrued which are recognized and acknowledged by the local customs, laws and decisions of courts, such rights are acknowledged and confirmed. Under this statute no right or title to the land, or to a right of way over or through it, or to the use of water from a well thereafter to be dug, vests, as against the government, in the party entering upon possession from the mere fact of such possession, unaccompanied by the performance of any labor thereon.

"Undoubtedly rights as against third persons are acquired by priority of possession, and the government will and does recognize such rights as between those parties. This is the principle running through the cases cited by the counsel for appellants. In **Sullivan** v. **Northern Spy Mining Company,** 11 Utah, 438, which is one of those cases, the priority of possession of the person who entered upon the public land and dug the well was recognized as thereby making a superior title to the use of the water from the well over that acquired by a person who was the subsequent purchaser of the land from the government. In that case the well had been dug and the condition fulfilled. If no well had ever been dug, and a reasonable time for digging it had passed, the mere priority of possession would have given no superior title to the land over that acquired by the grantee from the government. It is the doing of the work, the completion of the well, or the digging of the ditch, within a reasonable time from the taking possession, that gives the right to use the water in the well or the right of way for the ditches of the canal upon or through the public land. Until the completion of this work, or, in other words, until the performance of the condition upon which the right to forever maintain possession is based, the person taking possession has no title, legal or equitable, as against the government. What, if any, equitable claims a party might have upon the government who did a large amount of work, but finally failed to complete the necessary amount to secure the water or right of way, it is not necessary to determine or discuss. Those equities would not, in any event, amount to an equitable title to the right of way or to the use of the water, and so need not be here considered."

In **United States** v. **Rickey Land & Cattle Company,** 164 Fed. Rep. 496, Rickey had taken appropriate steps to secure a reservoir site on the public domain, had purchased works of considerable value for the purpose of diverting waters into the reservoir site and was actually engaged in the construction of a tunnel to lead the waters from the reservoir for useful distribution, when the lands affected by his work were temporarily withdrawn, as here by the Secretary of the Interior for reservoir purposes. Rickey proceeded with the work under the contention that against the United States government he had acquired the vested right so to do. The government sought injunction under its bill, setting forth the facts, and the defendant, successor in interest to Rickey, demurred. The demurrer was overruled, the circuit court in so doing and in discussing the question saying: "It is very clear that no one can under these sections acquire as against the government a vested easement in and to public lands for a reservoir site until the actual completion of the reservoir, so that the waters to be impounded therein could be applied to the beneficial uses contemplated by the irrigation system of which it forms a part. This was the construction placed upon these sections by the Supreme Court in **Bear Lake Irrigation Co.** v. **Garland,** 164 U. S. 1, 18, 19, 17 Sup. Ct. 7, 12, 41 L. ed. 327."

There can be no argument so sharp as to whittle down the obvious and controlling meaning of the language of these decisions which we have quoted. That language imports this, and nothing but this, that until the completion of the work, no title, legal or equitable, vests in the appropriator, no right vests which the government of the United States is compelled to recognize. The property rights which do accrue are such as to protect the appropriator from the acts of all persons saving the paramount authority. So far as the United States itself is concerned, it is under no justiciable duty in law or equity to such an appropriator until his work shall have been completed.

Before completion what may the United States do? It may do as in the case of oil lands it has done, by withdrawals arrest all work before discovery, without compensation to the locator for his expenditures. (**U. S.** v. **Mid West Oil Co.,** 236 U. S. 459.) Congress, it is to be remembered, under the constitution of the United States, has the sole power of disposition and control of the public lands. (Const. U. S., art. IV, sec. 3, subd. 2.) In contemplation of this power, the respondent's argument that the orders of withdrawal in this case were temporary orders, that they operated only to suspend and not to destroy the rights of the original locators, and that those rights were revived in all their fullness upon the formal vacation of the orders of withdrawal loses all force in view of the congressional exercise of the power to which we have adverted. Congress, had it chosen to do so, without any order of withdrawal having been made by the executive department, could have granted the lands and rights to the city of Los Angeles, as in fact it did, during the existence of the orders of withdrawal. It may be conceded that to have done so would have been a harsh exercise of the power, but this concession can have no effect upon the legality of the exercise. So here the legal situation presented is, and this statement of it is made in the light most favorable to respondent, that before respondent's predecessors in interest had acquired any vested right in the matter against the United States, Congress, in the exercise of its supreme authority, made conveyance to the city of Los Angeles of the lands and of the waters in connection therewith for all the purposes for which they were designed to be used by the original appropriators. It must be held that these appropriators and all others upon the public domain act with the knowledge and under the peril to their ventures that this may be done. The property rights which they acquire while working and before those rights have become vested as against the government of the United States, are held, as it were, upon condition subsequent, in that they are liable to be extinguished at any time by an act of congress directed to that end.

The conclusion, without regard to any other questions presented, is determinative of this case, and the judgment and order appealed from are therefore reversed.

SUGGESTIONS FOR CONTRACTOR AND DEALER

DEPARTMENT CONDUCTED BY GEORGE A. SCHNEIDER

(One well lighted show window serves as an advertisement to bring in business for more. How to interest the local merchant in adequate lighting is here taken up from the standpoint of the dealer. A discussion of the types of motors for use with centrifugal pumps, a suggestion as to how to eliminate troubles due to abnormal voltage conditions and a note on the rating of fuses follow.—The Editor.)

FALL BUSINESS FOR THE CONTRACTOR

Paragraph "e" of section 35, applying to the installation of gas filled incandescent lamps, in the City of Chicago electrical code reads as follows:

"Where the lamp comes within the usual range of vision, it must be provided with a suitable shade which will so reduce the intensity of the light that it will not be injurious to the eyes."

While this is a sane and sensible requirement, it is only a local ruling and when considered in this light will probably be only of passing interest to many of our readers. It is repeated here not for the purpose of bringing out any particular requirement covering the installation of gas filled lamps, but rather to point out a field that is still latent with possibilities for the electrical dealer and contractor. We have reference to show window lighting. There is need for better and more efficient window lighting and it will pay any contractor or dealer to give this question careful thought during the coming months. A little study will show wonderful possibilities for business along these lines, and a well planned campaign will usually land a reasonable number of the prospects.

There are a number of reasons for poor show window lighting. The principal one is probably that many merchants do not fully realize the advertising value of a well lighted window. Others may think the expense too high whereas by the introduction of modern lighting units, the cost can usually be kept down to a reasonable and satisfactory figure. Again, many merchants try to improve their lighting simply by adding the new high candle power gas filled lamps to existing fixtures. The results are seldom satisfactory and the windows while being brilliantly lighted do not attract the public. We see many examples of this kind wherein the body of the new lamp placed in an old shade or reflector projects so much that the light rays fall within the direct vision of the eye. It is more than likely that the Chicago ruling was drawn up to cover just such cases. Finally, many windows remain poorly lighted because the matter is not called to the attention of the proprietor. All of these points should be remembered in planning a campaign to get business of this kind.

When the dealer has not a solicitor who can spend considerable time on this work alone, enabling him to personally call upon all of the merchants in the vicinity who need better lighting, it is well for the dealer himself to make a study at night. One store in each block should be selected as a prospect, if possible. The windows should be carefully studied. Notes on the size of the window and area of the window floor space should be taken. After this has been done, the dealer should get in touch with his jobber and secure the latest bulletins covering such lighting installations. He should then determine the most satisfactory type of shade, the number of units and their size required, the approximate first cost of the installation and the probable operating cost, at the prevailing rate of energy for this purpose. With this information compiled he is then in a position to approach his prospective customer and present his proposition most effectively. Sometimes it is best to do the preliminary work by a letter with which is enclosed a bulletin on window lighting. Again a personal call may be best. It will depend entirely on the customer. In any event, once the first prospect is landed, the others become easier, because good window lighting makes an attractive store and other merchants in the vicinity will soon take note of the new installation.

TYPE OF DIRECT CURRENT MOTOR FOR CENTRIFUGAL PUMPS

One of the large electrical manufacturers now recommends motors of the compound-wound type where direct current motors are required for direct connection to centrifugal pumps and further refuses to accept any responsibility for motor operation when customers insist on shunt-wound machines for this purpose. This is an important point. It should be noted carefully by those who may have occasion to handle motor driven centrifugal pumps because in the past it has been common practice to use shunt-wound motors almost exclusively. The later editions of several engineers' handbooks still recommend motors of this class.

Shunt-motors were selected and considered satisfactory because of the low starting torque required by centrifugal pumps. In fact, the torque required by pumps of this class during starting is so low that the characteristics of the motor in this respect become of relatively slight importance. It has been found, however, that the speed regulation and other operating characteristics of the compound-wound motor more nearly counterbalance certain characteristics of centrifugal pumps and in general motors of this type are better suited for this class of service.

In the ordinary stock compound-wound motor with 20 per cent series winding, the drop in speed from no load to full load ranges from 15 to 25 per cent. For centrifugal pump service a closer regulation is better. Motors with a 10 per cent series winding are recommended by this same manufacturer when for use with these pumps.

VALUE OF A VOLTMETER TO THE CONTRACTOR

A large proportion of the troubles with electrical apparatus and appliances is due to abnormal voltage conditions, especially in connection with utilization devices. In most cases the voltage will be found below normal but occasionally trouble due to abnor-

mally high voltage is experienced. Trouble due to low voltage is usually more easily detected than for the reverse condition because the manifestations due to high voltage more nearly resemble other common causes of trouble. Let us illustrate this point more in detail. When operated at lower than normal voltage, lamps will not burn up to full brilliancy, heating devices will not attain their full heat and motors will tend to overheat. The cause of the unsatisfactory results from the lamps and heating devices will at once be apparent. With motors, however, it is necessary to determine whether the overheating is due to overload or low voltage.

Now consider the reverse conditions. With high voltage the life of lamps and heating units is considerably decreased; in fact, if the voltage is abnormally high these may burn out almost immediately. Motors operating above normal voltage tend to overheat when running idle. It is therefore necessary to determine whether the trouble is due to overload or high voltage. On the contrary, when lamps or heating units fail on account of being operated on high voltage the trouble is often charged to defective lamps or units. Very little thought is given to the question of voltage.

Two instances which will serve well to illustrate these points came to the writer's attention some time ago. A 2 h.p. 220-volt induction motor which was direct connected to a certain machine burned out after having been in use for a very short time. Immediately the machinery house who had purchased the motor claimed it to be defective. This was perfectly logical, however, because they had been selling machines of the exact kind equipped with the same type and size of motor and had not previously had trouble so they were reasonably sure the motor could not be overloaded. The machine was urgently needed and so to avoid delay a new motor was sent to replace the burned out one. At the same time instructions were given to the operator to inspect the motor frequently to observe if it was overheating. After having been in use but a short time the motor became very hot and was shut down. Then it was suggested that the voltage be tested. This was done and the motor was found to be operating at 240 volts instead of 220 for which it was wound.

The other case involved burned-out units in a large range. The dealer who sold the ranges and also made the installations claimed the units were defective and in accordance with the terms of the guarantee covering the range, the manufacturer replaced the units promptly. But again they burned out in a very short time. Then the voltage was tested. It was found to average 124 volts while the units were designed for 110 volts. Units for 120 volts were substituted and the units are still giving good service, although it is several months since they were put in to replace the burned-out ones.

It is just such instances that bring home the thought that every electrical contractor should have a reliable portable voltmeter. Such instruments can now be obtained at a very reasonable price and will often save their first cost in a few months. There are a number on the market that are quite satisfactory. One type which seems especially suited to the needs of the contractor is the Weston Model 155. It is reasonably light, has a good scale and will stand considerable rough handling. It can also be supplied with one, two or three scales covering a wide range. For general work an instrument with 300 and 150-volt scales is probably most convenient, but if 440-volt motor circuits are extensively used in the vicinity, a 600-150-volt or a 600-300-150-volt scale would be more useful. For any of the combinations no external resistors or multipliers are necessary.

VOLTAGE RATING OF FUSES FOR 500-VOLT A. C. SWITCHES

There seems to be some misunderstanding regarding the voltage rating of enclosed fuses for 500-volt A. C. fusible knife switches. The writer has noted several instances of late wherein 250-volt fuses instead of 600-volt fuses have been specified for this service.

In connection with this question, it is well to note the specifications of the National Electrical Code covering such apparatus. Paragraph 65, in the 1915 issue of the Code, covering switches reads in part as follows:

"Switches designed for 250-volt d.c. or 500-volt a.c. circuits, without fuses on the switch base, must be marked 250v., d.c., 500v., a.c. When 250-volt fuse terminals are mounted on the switch base, the marking of the switch must be 250v., d.c. and a.c. When 600-volt fuse terminals are mounted on the switch base the terminals must be spaced for 600-volt fuses and the switches marked 500 volts a.c."

From these requirements, it is, of course, perfectly clear that cut-out terminals on switches for over 250 volts, must be designed and spaced for 600-volt fuses. Therefore, only 600-volt fuses can be used with 500-volt A. C. switches. The 500-volt A. C. switch is nothing more than a 250-volt D. C. switch with suitable terminals for 500-volt fuses.

On account of the larger spacing required in 600-volt switches they are considerably higher in cost than the corresponding 500-volt A. C. switches. This is especially noticeable in the switches of the enclosed type.

SELECTING TIME SWITCHES FOR APARTMENT HOUSE LIGHTING

There are usually two groups of lamps in apartment house lighting, one for the halls and the other for the exits. Sometimes it is necessary to light both groups early in the evening, then later on one group is extinguished, the other burning until morning when it is also extinguished. Again the groups may be arranged so that the hall lights only are lighted in the evening. Later these are extinguished but at the same instant the exit lamps are lighted and allowed to burn until morning when they are extinguished. When selecting a time switch these points should have attention, otherwise the wrong switch may be chosen.

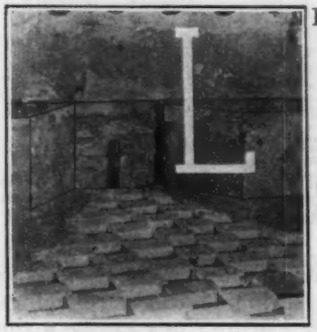
One of the well known time switches is so designed that either of the operating combinations just noted can be selected depending upon the connections between lamps and switch. As received from the factory, the connections are arranged so the groups would be controlled in accordance with the second method. However by changing the external connections the other combination is possible. No doubt several other clocks in the market would also work either way. In any case this could be determined by a few simple tests which the wiremen could easily make.

FUEL OIL AND STEAM ENGINEERING

(Recent evolution in efficient operation of the furnace for fuel oil burning emphasizes even more clearly than in the past that the furnace design itself has more to do with the production of economic results than any other single factor. In this article the authors first describe the operation of the fuel oil furnace and then, step by step, trace the evolution in design from the early days of fuel oil application a score of years ago to the present efficient furnace design in the modern boiler installations both on land and sea.—The Editor.)

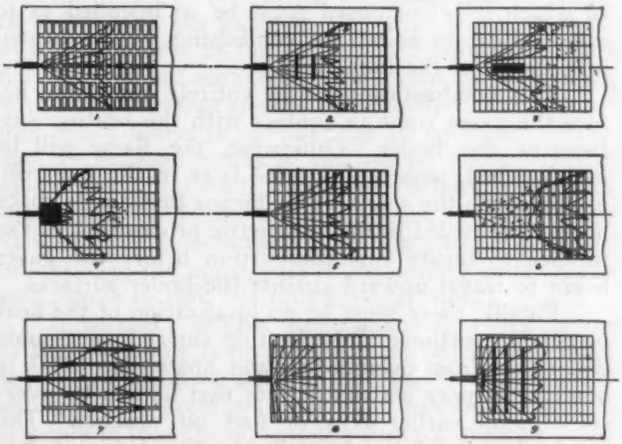
FURNACES IN FUEL OIL PRACTICE

BY ROBERT SIBLEY AND CHAS. H. DELANY



Interior of a Furnace, showing Brickwork and Air Spacing

LET us now set forth the cycle of operations necessary in the utilization of crude petroleum as an economic factor in the production of steam. The oil in a heated state and under pressure must be sprayed into a heated compartment or furnace so that its particles are in fine globules or even in a gaseous state. Such an operation is known as atomization and this must be accomplished in an efficient and thorough manner. Three methods are utilized in practice to accomplish this. In the first instance steam under pressure is mixed with the oil and the ingredients thus shot into the furnace. In the second instance compressed air is used to accomplish this result, and in the third instance, some mechanical device or physical characteristic of the oil is made use of to whirl or thrust the oil into the furnace in a pulverized or



THEORETICAL DISPLAY FOR BRICKWORK AND AIR-SPACINGS

In the nine illustrations shown above are graphically displayed the behavior of the furnace flame and the formation of carbon for various arrangements of air spacings below the flame. In the ninth instance a theoretically perfect flame is obtained.

atomized state. Literally hundreds of inventions have been made to effect the atomization of oil. It is to be remembered, however, that in the consideration of fuel oil economy, the furnace and its efficient construction are after all the real factors that go toward economic fuel consumption.

Fuel Oil Furnace Operation.—When the oil is atomized, it must be brought into contact with the requisite quantity of air for its combustion, and this quantity of air must be at the same time a minimum to avoid undue heat losses that may be carried away in the outgoing flue gases. To accomplish this result the checkerwork under the burners that control the admission of air must be properly designed. The proper quantity of air admission as a whole is controlled by means of draft regulation. An illustration of how this may be sensitively controlled was shown in the chapter on the fundamentals of furnace operation.

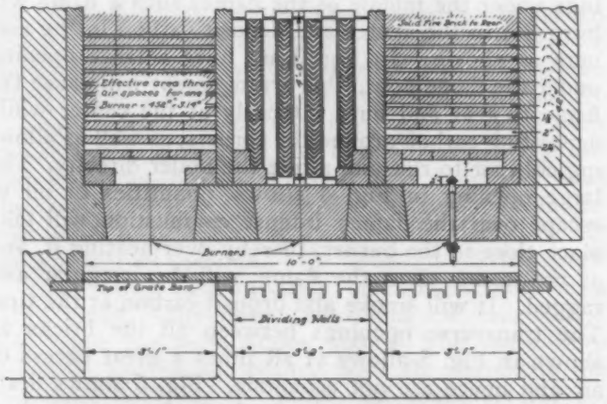
To accomplish the even admission of air into the furnace the arrangement of the check-board of brickwork below the flame is of utmost importance, otherwise unequal heating and imperfect combustion is sure to follow. Let us then examine a chart formulated by E. N. Percy of the Standard Oil Company's technical staff. In Fig. 1 we have a fan-shaped flame with openings between all the bricks. The flame does not cover all of the bricks, hence, no matter what the conditions are there will be an excess of air and the boiler cannot work economically since it costs as much to heat air as it does to heat water. Fig. 2 shows two large openings under the middle of the flame; such a flame will burn hot in the center and deposit carbon in the corners as shown. In Fig. 3 we have a large opening under the flame flow; this arrangement will cause the flame to tear and burn intensely at the center while depositing carbon around the corners, as well as allowing cold air to rise and strike the boiler directly. The large opening in Fig. 4 allows quantities of oil to escape over the flame; intense combustion will take place close to the burner, thereby over-heating it, and at the same time the flame will be irregular and ragged. It will smoke and deposit carbon at the tips. The transverse openings between all the bricks as shown in Fig. 5 allows at all times a great excess of air and hence are not economic. Fig. 6 shows draft orifices in the neighborhood of the burner; such a flame will burn clear at the tips, but it will smoke and deposit carbon near the burner. The longitudinal slots in Fig. 7 tend to tear the flame. In Fig. 8, the arrangement gives a broader and more correctly shaped flame, still an excess of air is admitted and cold air allowed to pass up against the boiler because the draft slots extend beyond the end of the flame. Fig. 9 approaches more nearly to the correct arrangement of bricks and the correct shape of flame for a flat flame furnace.

An excellent furnace is shown in the illustration which shows the floor plan of a back shot furnace arrangement, the burner being set in a recess in the bridge wall. The recess is made large enough for the removal of the burner and piers of fire brick are built

on the furnace floor in front of the recess so that there is an opening about 12 in. by 9 in. through which the mixture of oil and steam enters the furnace from the burner. A certain quantity of air enters through the same opening, being drawn in by the force of the oil and steam. A bracket is provided to hold the burner at the center of the opening.

Air openings through the checker work on the grates commence some 8 or 10 in. from the burner, the number of openings and the width increasing gradually until about two feet from the burner the openings extend across the full width of the furnace. There are no openings between the burners near the bridge wall so that no air can enter except where it comes in contact with the atomized oil. The fire brick piers between the burners become hot and assist in the ignition of the oil.

The distance the air openings are extended from the burners and the total area of air openings depends on the draft available and the capacity required from the boiler. With a draft of .1 of an inch in the furnace a free area of 2½ sq. inches per rated boiler horsepower through the checker work and ½ sq. in. per horsepower around the burner, making a total of 3 sq. ins. per horsepower, is sufficient to operate the boiler from its rated capacity up to 50% overload. If more capacity than this is required either a greater furnace draft must be provided or more openings through the checker work must be installed so as to increase the area. The amount of stack draft necessary to maintain .1 of an inch furnace draft depends upon the type of boiler and the capacity at which it is operated as this will determine the draft loss through the boiler. The loss of draft between the

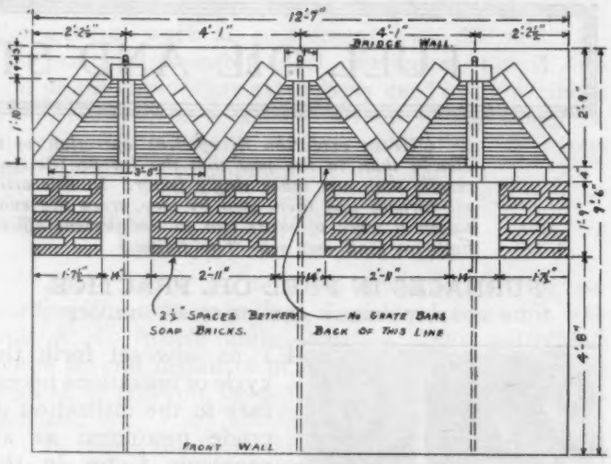


ARRANGEMENT OF AIR SPACES AND GRATE BARS FOR FUEL OIL PRACTICE

The details of furnace construction have more to do with efficient operation in the burning of fuel oil than anything else. In each particular installation this matter should receive careful attention. In the illustrations are shown the plan and elevation of the air spaces and grate bars for the Parker boiler installation for the Fruitvale Station of the Southern Pacific Co. This boiler developed an evaporative efficiency of 83.69 per cent under trial test.

breeching and the furnace usually runs from about .15 of an inch at the boilers' rating up to .8 or one inch at double rating.

The location of the flame can be varied by changing the height of the burner above the checker work, this height usually varying from 4 in. to 8 in. or 9 in. The character of the flame can also be varied by changing the distance the air openings extend from the burners. It is customary to have the furthermost air openings about four or five feet distant from the



AN EXCELLENT FURNACE DESIGN FOR FUEL OIL BURNING

In this view the floor plan of a back shot furnace arrangement is shown. The burner is set in a recess in the bridge wall. This design has proven of high order in central station installations of the West.

burner, the furnace floor beyond this point being covered with solid brick. By bringing the air openings somewhat farther out than this the flame can be made to turn up or by having the air openings extended out a shorter distance the flame can be made to hug closely to the floor of the furnace.

The Commercial Furnace. — Illustrations are shown in this article that set forth the check-board of brick work for air admission in the commercial practice of boiler economy. Let us now consider all the principal factors that must be considered in picking an efficient type of commercial furnace.

The furnace must be constructed of such heat tested brick-work that it will stand up under the high temperatures developed and the refractory material of which it is composed must be so installed as to radiate heat to assist the combustion of the heated ingredients of the fuel.

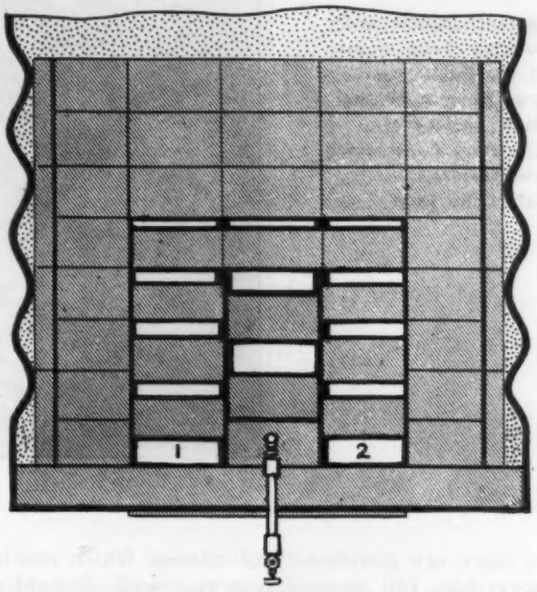
This combustion must be entirely completed before the gases come in contact with the heating surfaces of the boiler. Otherwise, the flame will be extinguished, possibly to unite later in the flue connection or in the stack. This means that ample space must be provided in the volumetric proportions of the furnace to insure this combustion before the gases begin to travel upward against the boiler surfaces.

Finally, there must be no localization of the heat on certain portions of the heating surfaces or trouble will result from overheating and blistering. This is one of the more serious defects that had to be overcome in the earlier days of fuel oil practice. The burner has much to do with the avoidance of this localization activity.

Regulation of Air.—The area of air openings through the checker-work should be made of sufficient size to operate the boiler at the maximum capacity required and then when operating at lighter loads the air supply should be very carefully regulated. There are two ways by which the air can be regulated, namely, by the damper at the outlet of the boiler or by the ash pit doors. If the air is regulated by the ash pit doors, the damper being left wide open, there will be a strong draft within the setting tending to cause air to leak in through all the cracks in the brick

work. The strong draft also tends to pull the gases through the setting by the shortest cuts so that a thin stream of gases flows through and the setting is not properly filled out so that some of the heating surface is not swept by the gases.

If on the other hand the ash pit doors are left wide open and the air is regulated by partly closing the damper, the draft inside the boiler setting is very



PLAN OF BRICKWORK AND AIR SPACINGS IN MARINE PRACTICE

In the practical application of the theoretical deductions for proper air spacings commercial designers differ somewhat from the theoretical reasoning involved. In this illustration is shown the brickwork and air-spacings for Scotch marine boilers recommended by a prominent company.

slight so that the air leakage is reduced to a minimum. There is little force tending to change the direction of the flow of the gases so that they travel of their own momentum to the furthermost corners and fill out the setting completely, thus coming in contact with all the heating surface of the boiler. It is, therefore, much better to regulate the air by means of the damper than by means of the ash pit doors. In the case of very light loads, however, it is best to use both the damper and the ash pit doors because if the damper alone is used there may be a positive pressure produced in the upper part of the setting causing gas and smoke to leak out into the fire room.

Importance of Air Regulation.—The regulation of the air supply is one of the most important things in the operation of oil fired boilers. If there is not enough air a great waste of fuel may occur as it is possible to feed the oil into the furnace in large quantities and if there is not enough air to burn it the oil and gas will simply pass up to the chimney unburned. On the other hand, it is possible to waste just as much fuel by allowing too much air to enter the furnace as all of the extra air is heated up and passes out at the temperature of the chimney gases, carrying away with it an enormous amount of heat. To determine accurately the amount of air required for the best conditions it is necessary to analyze the flue gases. Many plants, however, are not provided with the apparatus necessary for this and in such cases the air may be regulated with a fair degree of accuracy by an observation of the smoke discharged from the stack. For perfect combustion there should be no smoke and if any smoke appears it means incomplete combustion and not enough air. If there is no smoke, however, it does not follow that the conditions are right, as no smoke may mean either just the right amount of air or a large excess of air. To properly regulate the air, therefore, if the boiler is operating with no smoke the damper should be gradually closed until a light gray smoke just begins to appear; if then the damper is opened very slightly this smoke will be barely perceptible and the conditions for the most economical operation will be obtained.

Service For One Burner Only.—Where boilers having more than one burner are operated at very light loads it is necessary at times to have only one burner in operation, the other burners being shut off. For such service as this it is very desirable to have the ash pit divided into as many sections as there are burners so that when one burner is shut off the ash pit door opposite that door can be closed tight and no air from the other ash pit doors will enter the furnace opposite that particular burner. With this arrangement it is possible to operate a large boiler at fractional loads and still maintain fairly good economy.

NEW NORWEGIAN ELECTRODE FACTORY

Previous to the war most of the electrodes imported into Norway came from Italy, Sweden and the United States, but for some time now the imports have come almost solely from the United States.

In anticipation of its plant becoming inadequate and the necessity of erecting a branch factory, the Norske Elektrodeverker has purchased the rights to the entire power to be derived from a waterfall on the west coast of Norway near Kristiansund.

TELEPHONE COMPANY'S PROTEST AGAINST BRAZIL'S INCOME TAX

As a protest against the collection of a new 5 per cent tax on incomes, the Port of Para Corporation, the Société des Chemins de Fer du Bresil, the Interurban Telephone Company, and many other foreign corporations have applied to the Federal Court and obtained an injunction to restrain the government from collecting this 5 per cent upon dividends and interest coupons of their shares, on sums paid here or abroad. The Federal collectors have likewise been provisionally advised that the collection of these amounts is considered to be illegal.

ELECTRICAL ARTICLES REQUIRING EXPORT LICENCE.

Electric light carbons, electrical equipment and instruments, generators and motors, aeronautical and wireless apparatus, electrically driven pumps, searchlights, tungsten, telephone and x-ray apparatus—and electrical equipment generally are among the articles included under the second division of the President's proclamation, requiring license for export to any foreign country. Application Form A-2 is the license form to be executed by shippers and may be obtained from the Bureau of Export Licences, 2435 K street N. W., Washington, D. C., or from any branch of that bureau.

CONVENTION OF UTAH SOCIETY OF ELECTRIC

At a meeting held in Salt Lake October 5th and 6th, and attended by representative contractors and dealers from all sections of Utah and Idaho, the Utah Society of Electrical Contractors and Dealers was organized and launched under exceptionally favorable conditions, and with great enthusiasm on the part of those present.

Following a noonday luncheon at the Commercial Club, on Friday, John V. Buckle of Salt Lake in an address of welcome pointed out the value and need of an association embracing not only the State of Utah but also such parts of Idaho, Montana and Wyoming as might have interests in common.

Among the subjects he suggested for consideration by the new association were the creation of a State Inspection bureau, organization of a credit bureau, and frequent meetings to discuss subjects of vital interest such as improved methods of accounting; figuring of costs and ways and means of increasing the scope and volume of their business.

La Fayette Hanchett, Commissioner of Salt Lake county, taking as his theme the text "Out of the dreams of men," reviewed the development of the electrical industry in a very interesting manner, quoting numerous personal experiences with the earlier types of present day appliances.

Starting with Franklin, who drew an electric current from the sky with his kite and key, he touched in turn on the important successive steps forward, pointing out how seemingly idle dreams have, through persistent and combined effort, become realities. The possibilities of the future are in his opinion equally great and the contractor-dealer should prepare himself to meet such advances.

W. R. Putnam, Division and Sales Manager of the Utah Power and Light Company, discussed the subject "Relationship of the Contractor to the Central Station" in his characteristic frank and outspoken manner. He pointed out the necessity of educating the public to the use of electrical appliances and showed how impossible it would have been for the contractor dealers alone to have developed the business in Utah to its present position except at a prohibitive cost to themselves, whereas the lighting company was in position to do so economically. He also pointed out the responsibility and obligation resting upon the management of the lighting company in relation to its stockholders, which must necessarily receive full consideration.

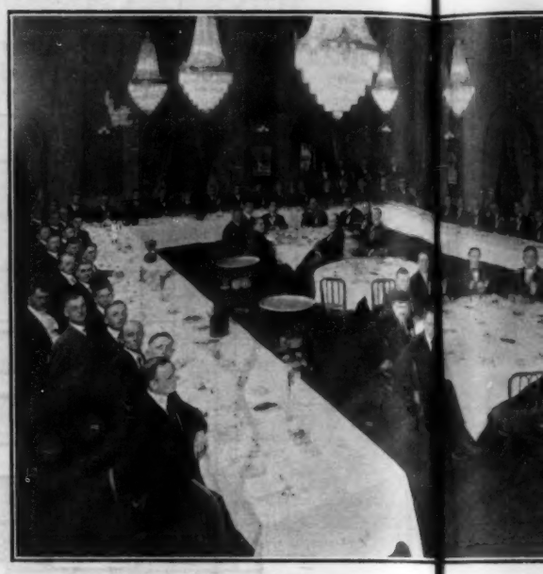
In closing he expressed his desire to assist in every way that he could, consistent with his company's interests, in improving the situation from the contractor dealer's standpoint.

W. M. Deming, of the Journal of Electricity, spoke on the value of organization in dealing with problems of mutual interest, pointing out the benefits derived from similar associations in other sections of the country and the necessity of keeping abreast of the times, especially during the present period of abnormal and rapidly changing conditions.

"The Relation of the Contractor to the Jobber" was covered in a most excellent manner by C. B. Hawley of the Inter-Mountain Electric Company.

THE OCCASION

An enthusiastic and striking group of men of the industry — the first banquet of the Utah Society of Electrical Contractors and dealers, Salt Lake City.



That there is a community of interest which can best be served by full co-operation was well brought out in his talk.

Edw. H. Eardley, of Eardley Bros. Co., taking as his subject "Why a State Electrical Organization," set forth in a concise and convincing manner the many arguments in favor of such an organization, quoting in support of his views statements of E. N. Hurley, now head of the U. S. shipping board, but who while serving on the Federal Trade Commission made an exhaustive study of trade conditions and the effect of trade associations in connection therewith.

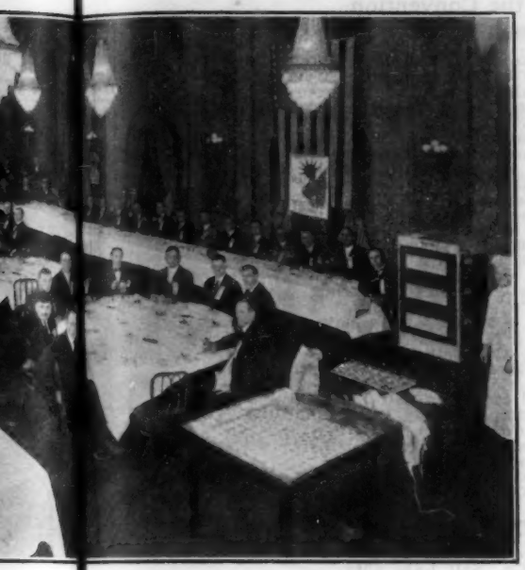
The meeting on Saturday opened with an address by the Hon. Simon Bamberger, Governor of Utah, in which he outlined general conditions throughout the State, referring to the serious situation brought about by the shortage of labor which might result in more or less serious loss of foodstuffs unless the canneries receive prompt assistance.

He heartily endorsed the motives in forming the association and expressed the opinion that it would prove of great value in developing the national resources of the State, as well as the individual interests of the members.

The Rev. P. A. Simpkins, in an address interspersed with his characteristic wit and humor, stated that while we might expect continued prosperity at the close of the war, it would undoubtedly be on a basis of keener competition and closer margins of profits. The members of the association have a duty to perform in that they must educate themselves so as to deal intelligently with the new problems so soon to confront them and also become better servants to the public, whose education should be conducted along broad lines.

"The Need of a State Inspection and the Organization of a State Inspection Bureau" was discussed

ELECTRICAL CONTRACTORS AND DEALERS



THE DEMONSTRATION

True to ideals of the industry, the banquetters partook of hot viands prepared by the electrically operated oven observable in the foreground.

by Fred C. Winegar, City Electrical Inspector, who outlined the advantages and needs of same.

"The Electrical Contractor" was the subject of an interesting paper by Golden J. Guiver, Business Agent of the Utah Society of Electrical Contractors, in which he outlined present conditions and the advantages to be obtained from closer co-operation.

The constitution of the society submitted by the committee was after slight changes adopted unanimously and the following officers elected for the ensuing year:

President—John V. Buckle, Buckle Electric Company, Salt Lake.

Vice-President—L. G. Robbins, Robbins Electric Company, Salt Lake.

Executive Committee—E. H. Eardley, Eardley Bros. Company, Salt Lake; Leroy Bourne, Provo; B. D. Phillips, Phillips Electric Company, Brigham; N. L. Taylor, Cache Valley Electric Company, Logan, Utah; E. A. Brough, Montpelier Electric Company, Montpelier, Idaho.

At the close of the Saturday afternoon session the members and guests were taken for a sight-seeing trip about the city and Fort Douglas, concluding with an official photograph of the party taken on the steps of the State capitol.

Saturday evening the Utah Power and Light Company gave a banquet at the Commercial Club to the members of the association and its guests.

Mr. S. R. Inch, General Manager of the Utah Power and Light Company, congratulated the association on its progressive action, expressed his appreciation of the value of the contractor and dealer to the Central Station and also pointed out the advantages to the contractor dealer of the Central Station's activities in widening the field for electrical devices.

Mr. Putnam then introduced—

Markham Cheever, Manager of the Phoenix Construction Company and Chief Engineer of the Utah Power and Light Company;
Bismark Snyder, Attorney for the Utah Power and Light Company;
P. N. Parry, Division Manager of the Ogden District;
E. R. Owen, Division Manager at Logan;
R. Timmerman, Division Manager at Bingham;
D. E. King, Division Manager at Park City;
J. F. Derge, Supt. of Lighting Appliance Sales;
R. E. Bailey, Supt. of Power Sales;
Glenn Walker, Supt. of Commercial Sales;
C. W. Kendall, Supt. of Residence Sales;
E. J. Falloon, Supt. of Irrigation Sales; and
R. H. Jones, Cashier,

all of whom expressed their pleasure over the step taken and promised their support.

A novel feature of the banquet was the installation of a large Hughes electric oven in the dining room, with a chef in cap and apron in charge, who prepared and baked the rolls and pastry served at the banquet, in full view of the diners.

The convention closed with a dance and reception at the Newhouse Hotel.

Surprising Results at the Utah State Fair

The Utah Power and Light Co. at Salt Lake City advises that results obtained from its exhibits at the State Fair held in Salt Lake during the week ending Oct. 6th were most gratifying.

Over $1000 was expended in equiping a number of separate booths, located at suitable points about the grounds, and so great was the interest in them that the services of from 8 to 12 experienced men were required to answer inquiries.

In one booth a large Hughes electric oven was in continuous operation baking biscuits, cookies, etc., which found a ready sale among the visitors. In fact, the demand far exceeded the supply.

In another booth equipped with electric ranges, demonstrations of cooking, roasting, etc., drew large crowds, while other booths equipped to demonstrate washing machines and electric irons; vacuum cleaners; percolators, toasters, grills and heaters; and other current consuming devices, were equally popular.

A large tent containing working exhibits of various power applications, such as electrically driven irrigation pumps, etc., was also a center of interest.

As the attendance at the Fair exceeded 60,000 and represented all sections of the State, the great value of this exhibit is apparent, and the lighting company is subject to congratulation.

Activities of Leaders of the Convention

W. R. Putnam, Division and Sales Manager of Utah Power & Light Co., Salt Lake, has put so many fine things across that it is no wonder his friends, of whom there seem to be a host, have nicknamed him "Put." He has made an enviable record for himself and his company by the manner in which he has en-

couraged and extended the use of electrical appliances throughout the territory he serves, yet, notwithstanding his aggressive policy in this respect he has retained the good-will and confidence of the contractors and dealers with whom he comes in contact. This is shown by the active part he was called upon to take in the organization of the Utah Contractors and Dealers' Association. His excellent work in this connection and his assurances of hearty and material cooperation have still further strengthened the cordial relations which previously existed.

"Put" has also been put in charge of the Publicity campaign in the State of Utah for the second Liberty Bond loan. That he is again putting it across is indicated by the fact that up to last Saturday over $2,000,000, or 20% of the State's quota of $10,000,000, had been subscribed, although the real drive had not yet begun. Our hats are off to "Put."

* * *

C. B. Hawley, of the Inter-Mountain Electric Co., is chairman of the committee which will solicit the electrical trade for the Liberty Loan. The interest shown at the recent association of the Utah Electrical contractors and dealers' meetings indicates liberal response.

* * *

Speaking of the Liberty Loan, the Utah regiment of field artillery, 1400 men, now stationed at Fort Douglas, celebrated pay-day by subscribing $100,000 for Liberty bonds, payments to be deducted from their pay. Utah may well be proud of her boys who not only volunteered their services but contributed so liberally of their money.

* * *

The various committees having in charge the detail arrangements for the meeting of the Utah Society of Electrical Contractors and Dealers are to be congratulated on the excellent manner in which they handled matters.

* * *

Z. S. Gwaltney, president and manager of the Idaho Electric Supply Co., Boise, Idaho, was a recent visitor in Salt Lake. He states that business in his section is most satisfactory.

The Electrical Contractors and Dealers at Play

The bowling contest Friday evening resulted in an overwhelming victory for the contractors, the score being 1356 to 1236 in their favor. If the team work displayed by the contractors, both players and spectators, in this contest is a fair index of what may be expected from them in future, the success of the Utah Association is assured.

The line-up was as follows:

Contractors	Jobbers
Buckle	Rinehart
Guiver	Ackerman
Boyd	Folland
Wolters	Hawley
Forsberg	Moser
Hild	Carter
	Evans

Ackerman carried off the individual honors with a score of 111 for one game, but Guiver, Buckle and Boyd also passed the century mark.

Wolters must be a baseball fan also, for at a critical point of the game he gave an excellent demonstration of a slide for the home plate.

The jobbers gave various excuses for their defeat. Hawley claimed that he had become so used to shooting for the hole in golf that he couldn't miss it now, even in a bowling game. Folland claimed that he must have overtrained. Even Rinehart seemed unable to get his range-finder working properly.

Registration at the Convention

W. R. Putnam, Div. Mgr. Utah Pr. & Lt. Co., Salt Lake City
J. V. Buckle, Buckle Electric Co., Salt Lake City
Edw. H. Eardley, Mgr. Eardley Bros. Co., Salt Lake City
G. J. Guiver, Bus. Mgr. Utah Soc. of Elec. Contr's.. Salt Lake City
Jas. L. Fugate, Eardley Bros., Salt Lake City
E. E. Brazier, Sales Mgr. Inter-Mtn. Elec. Co., Salt Lake City
Jas. Swyers, Jas. Swyers Electric Co., Salt Lake City
A. H. Nicoll, Western Electric Co., Salt Lake City
J. P. Anderson, Western Electric Co., Salt Lake City
Chas. F. Dowden, Inter-Mountain Electric Co., Salt Lake City
F. G. Allen, 82 E. Street, Salt Lake City
G. A. Hill, 224 Princeton Ave., Salt Lake City
Fred C. Wolters, Mgr. Modern Electric Co., Salt Lake City
Julius F. Derge, Utah Power & Light Co., Salt Lake City
G. A. Patterson, Inter-Mountain Electric Co., Salt Lake City
J. P. Sprunt, Jr., Westinghouse Elec. & Mfg. Co., Salt Lake City
E. E. Powell, Los Angeles, Cal.
F. W. Wilson, Standard Und. Cable Co., Salt Lake City
Ernest G. Dee, General Electric Co., Salt Lake City.
Julius Kurtz, Westinghouse Elec. & Mfg. Co., Salt Lake City
L. E. Brown, Westinghouse Elec. & Mfg. Co., Salt Lake City
J. M. Perlewitz, Western Electric Co., Salt Lake City
G. W. Forsberg, Inter-Mountain Electric Co., Salt Lake City
C. H. Sphar, Western Union Tel. Co., Salt Lake City
Chas. C. Bush, Inter-Mountain Electric Co., Salt Lake City
Myron Manwaring, Murray City Corp., Murray City, Utah
D. A. Sullivan, Utah Pwr. & Lt. Co., Layton, Utah
C. S. Jones, Jones Electric Co., Salt Lake City
R. S. Folland, Capital Electric Co., Salt Lake City
H. E. Webb, Brigham Electric Co., Brigham, Utah
Samuel F. Grant, Grant Electric Co., American Fork, Utah
L. G. Robbins, Robbins Electric Co., Salt Lake City
J. G. Larison, Mgr. Buckle Electric Co., Ogden, Utah
W. H. Showell, Showell Electric Co., Salt Lake City
F. D. Winegar, City Electric Inspector, Salt Lake City
H. J. Snavely, Western Electric Co., Salt Lake City
E. N. Maddox, Inter-Mountain Electric Co., Salt Lake City
Stanley S. Stevens, Century Electric Co., St. Louis, Mo.
E. A. Brough, Montpelier Electric Co., Montpelier, Idaho
F. E. Weidner, Inter-Mountain Electric Co., Salt Lake City
F. C. Rinehart, General Electric Co., Salt Lake City
Ray Ackerman, Capital Electric Co., Salt Lake City
H. D. Randall, General Electric Co., Salt Lake City
H. B. Lynch, Eardley Bros. Co., Salt Lake City
C. B. Hawley, Inter-Mountain Electric Co., Salt Lake City
E. R. Akert, General Electric Co., Salt Lake City
J. A. Van Dusen, Inter-Mountain Electric Co., Salt Lake City
H. M. Mayer, Inter-Mountain Electric Co., Salt Lake City
Wm. G. Bruce, Eardley Bros. Co., Salt Lake City
Darwin Ulke, Central Electric Co., Salt Lake City
C. H. Talmage, Western Electric Co., Salt Lake City
E. E. Reber, Inter-Mountain Electric Co., Salt Lake City
H. P. Stewart, Western Electric Co., Salt Lake City
P. B. Garoutte, Am. Steel & Wire Co., Salt Lake City
J. J. Crowe, Salt Lake Hardware Co., Salt Lake City
Leon D. Collins, Western Electric Co., Salt Lake City
S. W. Leaver, Inter-Mountain Electric Co., Salt Lake City
H. T. Plumb, General Electric Co., Salt Lake City
Lon. J. Haddock, Salt Lake City
R. C. Carter, Electric Supply Co., Salt Lake City
H. W. Read, Inter-mountain Electric Co., Salt Lake City
R. H. Jones, Utah Pwr. & Lt. Co., Salt Lake City
Willard Call, Call Electric Automatic Switch, Denver, Colorado
A. A. Moulton, Capital Electric Co., Salt Lake City
E. G. Holding, Holding Electric Co., Salt Lake City
Fern N. Boyd, Buckle Electric Co., Salt Lake City
N. L. Taylor, Cache Valley Electric Co., Logan, Utah
L. A. Herdte, Ogden Electric Supply Co., Ogden, Utah
Rev. P. A. Simpkins, Salt Lake City
C. L. Archer, Utah Pwr. & Lt. Co., Salt Lake City
H. C. McGregor, E. E. Board Fire Underwriters, Salt Lake City
H. L. Laub, Cache Valley Electric Co., Logan, Utah
Everready Martin, Ever Ready Co., Salt Lake City
Herman Kratzer, Salt Lake City
V. O. Phillips, Phillips Electric Co., Brigham, Utah
L. J. Christensen, Ass't City Electric Inspector, Salt Lake City
R. E. Bailey, Utah Pwr. & Lt. Co., Salt Lake City
D. E. King, Utah Pwr. & Lt. Co., Park City, Utah
Markham Cheever, Utah Pwr. & Lt. Co., Salt Lake City
S. R. Inch, Utah Pwr. & Lt. Co., Salt Lake City
Bismarck Snyder, Utah Pwr. & Lt. Co., Salt Lake City
C. W. Kendall, Utah Pwr. & Lt. Co., Salt Lake City
R. Timmerman, Utah Pwr. & Lt. Co., Bingham, Utah
E. J. Falloon, Utah Pwr. & Lt. Co., Salt Lake City
E. R. Owen, Utah Pwr. & Lt. Co., Logan, Utah
Glenn B. Walker, Utah Pwr. & Lt. Co., Salt Lake City
P. N. Parry, Utah Pwr. & Lt. Co., Ogden, Utah
R. E. Jerauld, General Electric Co., Salt Lake City
J. L. Schricker, Inter-Mountain Electric Co., Salt Lake City
Geo. Bennett, Eardley Bros. Co., Salt Lake City
H. S. Dinkelacker, American Electric Co., Twin Falls, Idaho
Harold W. Langton, Eardley Bros. Co., Salt Lake City
Arthur Purdon, General Electric Co., Salt Lake City
B. C. Rand, General Electric Co., Salt Lake City
T. A. Purton, General Electric Co., Salt Lake City
Chester P. Cahoon, Progress Electric Co., Murray, Utah
W. B. Goddard, Capital Electric Co., Salt Lake City
H. K. Schiebe, Capital Electric Co., Salt Lake City
Geo. R. Randall, Salt Lake Electric Supply Co., Salt Lake City
Ross L. Douglas, Capital Electric Co., Salt Lake City
Robt. Miller, General Electric Co., Salt Lake City
E. F. Schettler, Inter-Mountain Electric Co., Salt Lake City
Jno. J. O'Carroll, Electric Supply Co., Salt Lake City
Dan'l A. Vierheller, Wilkinsburg, Pa.
W. M. Deming, Journal of Electricity, San Francisco, Cal.
Jno. Jones, Westinghouse Elec. & Mfg. Co., Salt Lake City
E. A. Evans, Westinghouse Lamp Co., Salt Lake City

SPARKS—Current Facts, Figures and Fancy

(The high prices of fuel and raw materials together with the scarcity in the labor market have brought about a serious condition in industry the world over, but still reports of trade are good and the electrical industry here as well as abroad is finding the time to do research work for the government and the money to subscribe to the Liberty Loan. Inventions and new applications of electricity are always of interest, particularly as it is difficult to say what new wrinkle of efficiency, even in the fields of peace, will be the one to win the war.—The Editor.)

It is interesting to note that Japan as well as the United States is suffering from the high cost of coal. Suggestion has been made there that the best solution of the situation is the placing of the regulation of prices in the hands of the government.

* * *

That we will some day get our fuel supply from weeds and garbage is suggested by Alexander Graham Bell. Alcohol and water power, as he points out, are going to be the two most dependable sources of energy for the future. A great field of usefulness is opening up for the engineer who will modify machinery to enable alcohol to be used as the source of power.

* * *

An interesting cooling plant is being used in Paris. Large pipes are laid down under the streets with small branch pipes leading to the cafés and restaurants. Engines from a central station keep up a continuous pressure, thus supplying air for cooling rooms at a ground temperature. Will some big electrically run refrigerating plant some day supply cool air for summer use, to balance the furnace of the winter?

* * *

The grasshopper is now proving itself dangerous to power plants. A new rival to the use of hydroelectric energy for the manufacture of nitrate products is found in the proposition of the Uruguayan Government to utilize the locust in the manufacture of fertilizer. This insect, it is stated, is rich in nitrogen and phosphoric acid. To fertilize your crop with the insect which was destroying it is to make lemonade of your lemons, indeed.

* * *

The high cost of living is made the basis for a cry for higher wages the nation over. But industry has to eat as well—and here is a hint as to what has happened to the prices of its food: Steel has advanced in price 300 per cent, lumber 125 per cent, rubber 110 to 115 per cent, paint 125 per cent. One mile of trolley wire cost $721 now, compared with $327 two years ago. What is eaten must be paid for—and the increase in costs can only fairly be met by an increase in earnings as well.

* * *

The peoples Gas Light & Coke Company of Chicago is utilizing the "movies" to sell a new gas heated electric washer that has just been put on the market. The machine boils and washes clothes at the same time. In order to demonstrate the appliance before the greatest number of possible buyers in the shortest possible time the company had a one-reel film made showing the "emancipated housewife" operating the machine. The picture is being shown in three moving picture theatres each week and it will be continued until it has visited every section of the city.

* * *

California is not behind in its war quota. A report from the engineering colleges throughout the country shows that seven out of fifty-one expect a 100 per cent attendance. Three only expect a loss as great as 40 per cent. Of these the University of California must be counted as one, for only 105 of 163 students in Civil Engineering are at hand this fall, and the College of Mechanics has lost fully one-third of its enrollment. Chemistry alone of the colleges shows an increase, its figure for 1917 being higher by 2 than in 1916.

* * *

A new condition confronts business men engaged in the production or distribution of foods, feed, fuel, including fuel oil and natural gas, fertilizer and its ingredients, and tools, utensils, implements, machinery and equipment required for the production of foods, feed and fuel. These lines of business are now by Act of Congress under Government control, and must be conducted in accordance with regulations to be issued from time to time by President Wilson, and by Herbert Hoover, who acts under his authority.

* * *

The branding of oranges and other citrus fruits of California, Texas and Florida with trade names by means of an electrical device promises to become a general practice. An electric iron is used to brand the orange. There is a big wheel filled with spokes. At the end of each spoke is a branding iron, or die, bearing the word to be used. The heat rises until it reaches a certain temperature, and then a thermostat arrangement shuts off the heat and reduces the temperature, so it is impossible to burn the skin of the fruit and at the same time the iron will not become too cool to perform its function.—Hot Point Weekly.

* * *

The Advisory Council has recommended that the money made available from the new five million dollar fund voted by Parliament should be spent in the form of grants in aid of research undertaken by firms in any industry which may combine to conduct it on a co-operative basis. The council advises that the best means to this end is the establishment, under the Companies Acts, of associations for research, limited by guaranty and trading without profit. The electrical engineering firms and the British Society of Aircraft Constructors, in conjunction with the Aeronautical Society, have the matter under consideration.

JOURNAL OF ELECTRICITY

FOUNDED 1887

PUBLISHED SEMI-MONTHLY BY THE

Technical Publishing Company

Crossley Building, San Francisco

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., required by the Act of Congress of August 24, 1912, of "Journal of Electricity," published semi-monthly at Francisco, California, for October 1, 1917.

State of California,
County of San Francisco—ss.

Before me, a notary in and for the state and county aforesaid, personally appeared Willis M. Deming, who, having been duly sworn according to law, deposes and says that he is the vice-president and business manager of the "Journal of Electricity," and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:
Publisher, Technical Publishing Company.....No. 6 Crossley Bldg., San Francisco
Editor, Robert Sibley.....No. 6 Crossley Bldg., San Francisco
Managing Editor, Willis M. Deming.....No. 6 Crossley Bldg., San Francisco
Business Manager, Willis M. Deming.....No. 6 Crossley Bldg., San Francisco

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.)
Technical Publishing Company..No. 6 Crossley Bldg., San Francisco
E. B. Strong.....San Rafael, Cal.
W. M. Deming.....San Francisco
R. J. Davis.....Ross
Robt. Sibley.....Berkeley, Cal.
A. H. Halloran.....Berkeley, Cal.
Mrs. L. B. Story.....Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of mortgages, or other securities are: None.

WILLIS M. DEMING,
Vice-President & Business Mgr.

Sworn to and subscribed before me this 29th day of September, 1917. (Seal.)
M. A. BRUSIE.
(My commission expires September 24, 1918.)

CONTENTS

Industrial Opportunities for Trained Women. *By Clotilde Grunsky* 343
Why the Shields Water Bill Should Pass..... 346
The Electrical Dealer's Profits. *By A. H. Halloran*..... 348
War Problems for Inventive Solution. *By John D. Galloway* 350
Western Windows That Win..... 352
Selling Electric Washing Machines. *By A. E. Kuhnhausen* 354
Effect of Losses by Fortuitous Events. *By C. E. Grunsky* 355
Short Journeys in Pacific Lands..... 356
Silver Lake—Los Angeles Aqueduck Decision..... 358
Suggestions For Contractor and Dealer. *By George A. Schneider* 361
Furnace Construction in Fuel Oil Practice. *By Robert Sibley and Chas. H. Delany*..... 363
Convention of Utah Society of Contractors and Dealers.... 366
Sparks—Current Facts, Figures and Fancy..... 369
Editorials 370
Personals 373
Meeting Notices for Electrical Men..... 375
Builders of the West XV. A. E. Chandler..... 375
Convention of National Contractors Association..... 376
Happenings in the Industry..... 377
Trade Notes..... 378
Latest in Everything Electrical..... 380
Good Books and Bulletins for the Engineer..... 382
What Western Inventors are Doing..... 384
New Electrical Developments..... 385

The Liberty Loan

In the good old days of long ago the word " loan" used to mean "a gift or grant by a superior of property to be held of him upon certain coditions." And cannot we, in this larger sense, follow this meaning of many years ago in our subscription to the Liberty Loan? In a word, the superior of property—the spirit of democracy in America — impels us to contribute our gift or grant to be held by the nation at large upon certain conditions, which are that this material symbol of democracy be used to liberate all mankind. A gift or grant under such conditions may then, in words of fiery eloquence, be well and properly defined as a Liberty Loan.

How about your new bond subscription to the gigantic Liberty Loan campaign now raging?

The Power of Technical Journalism

More and more it is being impressed upon the thinking mind that the great world issues now perplexing mankind are to meet their eventual solution by a consideration of the basic economic and technical problems involved.

In view of this fact the influence of technical journalism is each day being raised to a dignity hitherto unexperienced in the evolution of the educational, engineering and industrial activities of the nation. Thoughtful men are looking to the medium of the technical press—unbiased by political or selfish intrigue—as a forum for the expression of their thoughts and a place where scientific and accurate data may be found.

And on the other hand, those who have the privilege of wielding the editorial pen for the technical and scientific expression of the nation realize full well the increased responsibility that is thus automatically added to their burden of written expression.

The Journal of Electricity, now completing a period of thirty years of service in the West, in the prime of its splendid manhood, is fully aware of its added share of serious responsibility thrust upon its shoulders by the exigencies of this recent trend in the evolution of world affairs. As a consequence, it is with a note of pride and of patriotic fervor that the Journal of Electricity informs its readers of its renewed ambition to be an ever increasing factor, no matter how small, in the solving of some of the great world problems now before the nation, with especial reference to the engineering and commercial problems confronting the West and the countries bordering the great Pacific.

In addition to setting forth the current engineering and scientific progress of the day, it will be its

unswerving editorial policy to fearlessly give expression in condemnation, if necessary, to the practices of central station, regulatory commission, engineer, contractor, dealer or technical teacher that should be bettered, and on the other hand to call attention with praise for all commendable features of commercial and engineering life of this great district.

And, so far as strict adherence to the unstinted truth is maintained in this policy, it is believed its sphere of influence will broaden until, like the ripples of water from the sun-kissed shores of the great Pacific, its name and prestige will go forth and be established in every country and clime that line the greatest of all bodies of water—the vast Pacific.

Psychology of Oversubscription in Finance

The present progress of the subscription campaign for the second Liberty Loan portends new and hitherto unexperienced successes for the great world conflict.

The manner in which this loan is over-subscribed will have much to do with the psychology of winning the war. In other words its crushing effect on the enemy can not be overestimated.

It is not a favor to the government—but a gigantic economy to ourselves that an immediate oversubscription to the present Liberty Loan be made in such proportions as to stagger the former world achievements in finance.

Too Many Technical Societies

As progress is made in affairs relative to the world crisis, it becomes more and more apparent that never before in the history of the electrical industry did more necessity exist for men meeting together at frequent intervals for the dissemination of important facts and the discussion of problems of mutual interest. The vast complexity and overlapping of activities of the countless engineering and technical societies now existent are, however, daily forcing the conclusion upon thoughtful men that a glaring need for centralization and simplification of the present system is not only desirable but of utmost timely importance, if the engineering and industrial activities of the nation are to be kept in close and harmonious working condition for assisting the national government in the successful prosecution of the war and in keeping these activities themselves in a healthy and normal state.

On the Pacific Coast this critical state of affairs is especially marked. Too many engineering and technical societies are today endeavoring to keep up their organizations and still pay heavy expenditures to the parent Eastern organizations.

Conditions west of the Rockies are still so unique and different in themselves from the main body of engineering and industrial problems met by the nation as a whole, that it would seem the best of good policy to have one Pacific Coast society, committee, or council to properly handle matters of common concern. This clearing house could keep the industry as a whole in touch with affairs of national importance and at the same time deal with emphasis in matters of timely import in this vast district so far removed from the eastern centers.

In the ideal it would seem that one council of this nature could in a suggestive manner, vested perhaps with only powers of an advisory nature, do much toward unifying these paralleling and conflicting interests so that the maximum good could be accomplished with minimum outlay of time and money.

While such action could well be taken for all engineering and technical endeavor on the Pacific Coast, the simpler task would seem first to be that of readjusting and harmonizing the societies that are particularly related to the electrical industry—such societies, for instance, as the various sections of the American Institute of Electrical Engineers, the various sections of the National Electric Light Association, the Jovians, and the several electrical development leagues in various cities of the West.

By a proper and harmonious planning of these activities more good and better helpful results can be obtained than in the rather conflicting scene that presents itself at present to any one who gives the matter thoughtful consideration.

It is to be hoped that all those having at heart a love for efficiency and the saving of waste, among the most important of which is the saving of precious time and energy, will give this matter careful consideration and that early action will be taken by the various engineering and technical organizations of of the West, looking to a more effective and harmonious working of all these activities.

Women in the Industries

The credit for the more active part which women have taken in industry in this above other wars is laid at the door of the electrically driven machine and the ease with which it may be handled. For instance in one munitions plant in Toronto, an electric lathe, operated by a woman, is turning out shrapnel shells at a rate which formerly with other machines, required the attention of six shopmen.

And now the electrical field is feeling the effect of its work. Women chauffeurs are to operate the electric trucks of a large New York concern, they are trained for the operation of electric locomotives, electric elevators and portable electric winches. Indeed, it is difficult to estimate where the boundary may in future lie between woman's work and man's work.

Should the present war continue to be the long drawn out affair some are prone to prophesy, it is not difficult to formulate the early situation in American industries. Even in the West, where intensive industrial life has not as yet been reached, the shortage of men is felt most keenly on all sides.

It is well that women prepare themselves by technical and vocational studies to fill this growing need for trained minds in the industries of the West.

The leading article of this issue of the Journal of Electricity is taken up with a timely and comprehensive discussion of this subject and it is believed that a quiet, thoughtful perusal of its contents will aid much in enlightening engineers and central station men of the electrical industry throughout the West on the present phase of this new and timely aid in national service — women in the industries.

Electrical Applications in Ship Building

Frequent comment has been made in the columns of the Journal of Electricity relative to the giant impetus to the industrial life of Pacific Coast cities that has been been given by the present vast ship building now under way in the various ship yards of the West.

Only those who have visited these installations can appreciate the innumerable applications of electricity in the tireless tasks that are being accomplished in building the Emergency Fleet for the nation.

As an instance of the large blocks of new power that are being diverted for these uses, a recent contract may be mentioned. This particular firm has been awarded by the United States Emergency Fleet Corporation the building of ten 400-foot steel vessels. Construction work on three of the vessels will start as soon as material and equipment can be delivered on the ground. The initial electrical installation for this plant will be approximately 1600 h.p.

Not only are large blocks of power thus being diverted, of interest to men of the industry, but the actual uses of this power are intensely interesting as indicative of the manifold applications of the modern method electrical.

As recently recounted by an Eastern writer, the inconvenience and waste due to using air tools in the construction of the riveted vessel has long been realized by the practical shipbuilder. Here he welcomes electricity. This is clearly shown by his willingness to introduce electric drilling and reaming. He is eagerly looking forward to a practical electric rivet heater, and hopes to see the air riveter replaced by an electric rivet-hammer. The enlivened interest in shipbuilding in this country will no doubt turn capital and brains towards the solution of these two important problems.

For the suggested welded type of vessel, although other methods of welding steel may be used, the advantages of electric arc welding and "spot welding" will not be overlooked. It cannot be doubted that, as electric power has taken a leading position in this business in the past, it will assume larger proportions in the future despite the development in the method of construction of the steel ship. Truly the electric way is the best way.

In contemplation of this brilliant future for new and important applications of electrical energy, all interested in seeing the great West come into its own in the development of its vast hydroelectric possibilities, gain renewed enthusiasm for the future industrial development of this section of the country.

A Review of the Hetch Hetchy

The recent refusal of the city engineer of San Francisco, backed by the Board of Supervisors and the Mayor, to allow the San Francisco Bureau of Governmental Research to review the present status of the Hetch Hetchy project will meet with considerable disapproval by the engineering fraternity as a whole.

But it must be remembered that the engineer having this project in charge has earned a well-won reputation for creative imagination and has built projects in the decade just gone by that have surpassed similar feats in engineering the world over, and as a consequence he has the respect and confidence of the engineering and commercial world generally. Again, this project has in previous years been reviewed by engineers of world-wide reputation and its good and bad features are largely a matter of record in the proceedings of national engineering societies and are even spread upon the records of the national Congress. But even more important than these arguments is the fact that the engineer of a project of such vast proportions as the one under discussion must of necessity have confidential data that he is entitled to withhold until satisfied with its correctness and until satisfied that the truths conveyed by such confidential information can not be perverted by others not versed in affairs of such magnitude and thus lead to erroneous and disastrous conclusions.

Yet in spite of all these telling arguments, the fact remains that there has been an undercurrent of gossip that has gone the rounds during the past season regarding this great project to such an extent that it has been the subject of comment at the informal luncheon tables of engineers and in the various banking houses of the West.

There is nothing that breeds suspicion and lack of confidence to a greater extent than an apparent unwillingness on the part of public officials to put all the cards on the table. Since time immemorial men of all ages have realized that the force of truth is almighty and it will prevail. Hence no fear of shallow or unjust criticism should be manifested in any project that is sound and well planned.

In view of this fact, and in view of the vast importance this undertaking is to the commercial and engineering future of the West, it is well that the most frank courting of a review of this project by others than those directly interested in its management, be undertaken by those having the giant task in hand. In this way only can confidence be instilled in the public generally, in order that hearty and widespread support be given to a task of such far-reaching proportions.

THE NEW JOURNAL SERVICE: The problems of the electrical contractor and dealer are so interwoven with those of the electrical industry as a whole that it has seemed best to present to our readers, in coming issues, short terse articles that deal specifically with some of these problems, such for instance as how to figure profits, how to take care of overhead, and how to keep accurate data on cost accounting. These articles are being written for the Journal of Electricity by experts who know and they should prove of timely aid to men of the industry throughout the West.

The co-operative spirit of helpfulness that is being manifested by readers of the Journal of Electricity looking toward a successful outcome of the big subscription contest which is being inaugurated November 1st, as announced elsewhere in this issue, is deeply appreciated by the editorial and managerial staff of the Journal of Electricity and it is confidently believed that the New Journal Service of the future will be raised to such a high plane of usefulness as to create a distinct factor in contribution of helpfulness to the Nation in these days of tense industrial activity.

PERSONALS

Ira N. Hollis, president of the American Society of Mechanical Engineers, is expected to visit various cities of the West during the latter part of October. Dr. Hollis is also president of the Worcester Polytechnic Institute, and one of the foremost and best known of the engineering profession in the country. He is an Annapolis graduate of the famous class of 1878 and was one of the active force in building the White Squadron of those days. In addition to his years of service with the Navy he was professor of Marine Engineering at Union College and held the Chair of Engineering at Harvard University from 1893 to 1913, where he was a leader in the development of the engineering department and also in the promotion of athletics, being chairman of the Athletic Committee for several years. In 1913 he accepted the presidency of the Worcester Polytechnic Institute, which he now holds. His large experiences in the Navy and all branches of mechanical engineering has made his services and advice of great value on the several national boards he has been giving much of his time to during the last two years. A dinner will be given in his honor October 25th, by the Joint Engineering Societies, consisting of the American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute Mining Engineers, American Institute Electrical Engineers and American Chemical Society. A large gathering is expected.

The San Francisco Electrical Development and Jovian League at its noonday meeting of October 24, at the Palace Hotel, will have Dr. Hollis as its guest of honor. Great enthusiasm is being shown in prospective attendance at this informal gathering, which members of all the engineering societies have been invited to attend.

C. E. Patterson, comptroller of the General Electric Co. at Schenectady, is a San Francisco visitor.

H. L. Harkness, electrical salesman with Hughson and Merton, Inc., has returned to San Francisco from an eastern trip.

George H. Scheu, foreman electrician of the Pullman Company at Salt Lake City, Utah, has been transferred to San Francisco, Cal.

Wooster Curtis, of the general office, General Electric Company at Schenectady, together with Mrs. Curtis is a ten-day visitor in San Francisco.

Robert Dickerson Pike, chemical engineer of San Francisco, has recently been elected a member of the American Institute of Electrical Engineers.

A. L. Martin, local manager of the Oregon Power Company at Marshfield, Oregon, has been appointed a member of the Coos County Defense League.

M. C. Osborn, commercial agent Washington Water Power Co. of Spokane, Wash., is expected at San Francisco on October 20th on his return from an eastern trip.

A. H. Babcock, consulting electrical engineer for the Southern Pacific Company with headquarters at San Francisco, is on a two months' visit to interesting Atlantic seacoast points.

S. G. Jackson, proprietor of the Berkeley Electric Construction Co. of Berkeley, California, has been drafted for army service and leaves for American Lake, Wash., on October 17th.

R. M. Alvord, president of the San Francisco Electrical Development and Jovian League, was a speaker at the recent quarterly banquet of the University of California Extension Division in Berkeley.

S. Allen Dyer, who has been a special representative of the General Electric Co. in Mexico and Central America for several years, was in San Francisco during the past week enroute to Schenectady.

J. A. Cranston, manager of the Portland office of the General Electric Company, and **A. K. Baylor,** of the general office of the General Electric Company at New York City, are recent San Francisco visitors.

T. C. Roberts, Chief Engineer of the United Verde Copper Company, and of the United Verde and Pacific Railway Company, has just been elected to membership in the American Institute of Electrical Engineers.

W. M. Deming, business manager of the Journal of Electricity, is back again in San Francisco after a week's visit to Salt Lake City, where he assisted in the recent organization of the Utah Society of Electrical Contractors and Dealers.

L. J. Todhunter has been appointed manager of the electrical department of Herr-Rubincam Supply Company, Denver, Colo. He was formerly assistant manager of the electrical department of the Hendrie & Bolthoff Manufacturing & Supply Company.

E. H. Sennott, assistant treasurer of the Metropolitan Building Company, Seattle, for the past eight years, has resigned to re-enter the employ of the Stone & Webster Engineering Corporation, and will go to France as financial director for that concern.

Romaine W. Myers, Consulting and Illuminating engineer of Oakland, gave an interesting illustrated lecture on "Controlled Lights" before the Oakland Engineers' Club in the Commercial Club rooms, Hotel Oakland, on Wednesday evening, October 10th.

Earl Fisher, of the commercial department of the Pacific Gas & Electric Company, is devoting the entire month in assisting the local Liberty Loan Committee in putting over the giant task of placing its share of bonds, the mammoth campaign for which is now under way.

Frank Rieber, chief engineer of the Rieber Laboratories, is back from an Eastern trip and is again in San Francisco where he recently delivered a talk on combating the submarine menace, before the San Francisco Section of the American Institute of Electrical Engineers.

Burwell S. Cutler has been appointed to the position of Chief of the Bureau of Foreign and Domestic Commerce, Department of Commerce at Washington, D. C. Mr. Cutler came into the Bureau six months ago to assist in putting the organization on a thoroughly business basis.

Stanley V. Walton, head of the commercial department of the Pacific Gas & Electric Company, has handed in his resignation to take effect the first of the year, in order that he may give his entire time to the development of property interests held by his family. Mr. Walton has long been recognized as a potent factor in the electrical industry of the West. In addition to his clean and efficient business methods, his kindly and pleasing personality has won for him a host of friends and well-wishers. It will be with a distinct feeling of regret that this announcement of his leaving the electrical field will be read by readers of the Journal of Electricity, yet the heartiest of good wishes go with him in his new undertaking.

W. J. Drury has been appointed manager at the Cleveland distributing house of the Western Electric Company. Mr. Drury was formerly sales manager at Dallas and is succeeded by W. P. Hess, who was formerly in charge of the sales work at Houston. Mr. C. W. Chesnut takes Mr. Hess' place.

George E. Kimball, formerly with The Pacific Telephone and Telegraph Company, has been appointed Electrical Inspector in the Safety Department of the Industrial Accident Commission. His appointment was made through the State Civil Service Commission following a competitive examination.

Freling Foster, until recently advertising manager, Hughes Electric Heating Company, Chicago, has joined the advertising staff of The Society for Electrical Development. He will take the place made vacant by the resignation of E. M. Hunt, who has become connected with the "Review of Reviews."

Wm. K. Freudenberger, chief engineer for the Public Service Commission of the State of Nevada, has resigned as his other business matters in Missouri require his attention. **F. O. Broili,** who has been connected with different power and manufacturing companies of Nevada and Oregon in engineering and managerial positions, has been appointed to fill the vacancy, and will take his new position Nov. 1, 1917.

Clyde B. Aitchison, formerly a member of the Oregon Public Service commission, has recently been named by the President for membership on the Interstate Commerce Commission. For some time Mr. Aitchison acted as attorney for the national organization of state railroad commissioners to represent their interests with the Interstate Commerce Commission, so that he is eminently fitted for the field he is about to enter.

George A. Hughes, of the Hughes Electric Company of Chicago, after taking a most prominent and helpful part in the electric range discussion at the recent Spokane convention, is now sojourning in Southern California. He expects to return east shortly. The many new friends made by Mr. and Mrs. Hughes throughout the West trust that they will again be with us in the early future and that their next stay may be much more generous than the present visit.

Harry Arthur Curtis, power superintendent of the Hydroelectric Dept., Government of Tasmania, **Carl Joseph Erickson,** engineer for the Western Precipitation Co., Los Angeles, **Arthur A. King,** chief electrician of the Arizona Commercial Mining Co., **Edward T. Nash,** electrical engineer of the Butte Electric Railway, **Heuchi Nukiyana,** of the Tohoku Imperial University, Sendai, Japan, and **Robert Reid,** electrical engineer with the Sierra and San Francisco Power Co., have been elected associate members of the American Institute of Electrical Engineers.

Harris J. Ryan, professor of electrical engineering at Stanford University, representing the Amer. Inst. of Elec. Eng.; **L. H. Duschak,** of the U. S. Bureau of Mines, representing the American Chemical Society; **C. D. Marx,** professor of civil engineering at Stanford University, representing the Amer. Soc. of C. E.; **T. A. Rickard,** editor of the Mining and Scientific Press, representing the Amer. Inst. of Mining Engineers; and **B. F. Raber,** associate professor of mechanical engineering at the University of California, representing the local section of the American Society of Mechanical Engineers, are all actively engaged in planning a cordial and hospitable reception for Ira N. Hollis, president of the American Society of Mechanical Engineers, at the Palace Hotel Thursday, October 25, 1917.

OBITUARY

J. K. Robinson, Chilean representative of the Westinghouse Electric Export Company, died at his summer home, Naples, Me., on September 7th after an interesting career in South American trade. Mr. Robinson was a fellow of the American Institute of Electrical Engineers, a member of the New York Electrical Society, and numerous other professional and social organizations in this country and abroad. He is survived by his wife and one daughter and by his mother.

MEN OF THE INDUSTRY GO A-FISHIN'

O. B. Stubbs and **S. W. Peterson** of the Stubbs Electric Co. at Portland; **C. M. Wills** and **F. N. Averill** of the Forbes Supply Co. at Portland; **H. B. Squires** of the H. B. Squires Co. at San Francisco; and **H. E. Sanderson** of the Bryant-Perkins Co. at San Francisco, together with J. G. Little, one guide and a cook went fishing immediately after the recent convention of the Oregon Association of Electrical Contractors and Dealers at Eugene. The north fork of the Willamette River was the location sought by this mighty group of sportsmen. The party was gone ten days, three ducks were killed and 1979 pounds of trout landed. Lack of bait is the reason given for the small catch reported. Further details of the trip can only be secured by personal interview.

NEW GAS RATES OF PACIFIC GAS & ELECTRIC CO.

The maximum gas rate to be charged San Francisco consumers henceforth by the Pacific Gas and Electric Company is 85 cents a thousand cubic feet.

This is the rate fixed by the Railroad Commission in a decision transmitted recently to the company's attorneys and the city attorney's office.

The new schedule follows:

First 10,000 cubic feet a meter a month, 85 cents a thousand.
Next 20,000 feet, 80 cents.
Next 40,000 feet, 75 cents.
Next 80,000 feet, 70 cents.
Next 150,000 feet, 60 cents.

TWO PUBLIC SAFETY HEARINGS

The Industrial Accident Commission has arranged for two Public Safety Hearings to be held in the Underwood Building, 525 Market street (Room 407), San Francisco. The first Hearing is called for Thursday, October 18th, at 10 a.m., to consider Tentative General Construction Safety Orders. The second Hearing will censider Tentative Revisions of Sundry Elevator Safety Orders on Friday morning, October 19th, at 10 a.m.

Similar Public Hearings will be held one week later in Room 405, Union League Building, Los Angeles, each commencing at 10 a.m., the Tentative General Construction Safety Orders on Thursday, October 25th, and the Tentative Revisions of Sundry Elevator Safety Orders on Friday, October 26th.

Two committees prepared the Tentative General Construction Safety Orders, one meeting in San Francisco and the other in Los Angeles.

The San Francisco committee was composed of the following: Sylvain Schnaittacher (chairman), E. T. Thurston (vice-chairman), Louis Bailey, Charles Wright, T. W. McClenahan, H. J. Ralston, Emil Hogberg, J. J. Connolly, Russell Hinton, Paul Abel, Walter English, Jos. Kiernan, Jas. A. Macdonald, N. H. McLean, William Wolf, Lawrence Flaherty, J. J. Rosenthal, John R. Brownell (secretary).

The Los Angeles committee was selected as follows: J. J. Backus (chairman), G. W. Saurret (vice-chairman), H. M. Scott, A. R. Walker, C. L. Peck, Burdett Moody, A. J. Werner, Erick Lund, W. E. Stradley, J. J. O'Connor, R. L. Mertz, R. D. Bland, M. L. Holmes, H. J. Henry, R. C. Porter, J. H. Williams, C. A. Hanna, L. A. Pockman, H. L. Boyd (secretary).

MEETING NOTICES FOR ELECTRICAL MEN

(Meetings of electrical men throughout the West, though not so frequent as those held during September, continue to bear fruitful results. Especially is this true of the recently organized society of electrical contractors and dealers of Utah, described elsewhere in this issue. The quarterly meeting of the Pacific Coast Electrical Supply Jobbers to be held in Southern California the latter part of this month, as set forth below, is perhaps the most important gathering of the immediate future. Notations on various engineering gatherings and development league meetings throughout the West may also be found here.—The Editor.)

Pacific Coast Electrical Supply Jobbers' Convention

Agreeable to a well earned tradition in cordiality, the forthcoming convention of the Pacific Coast Electrical Supply Jobbers is being planned by president Taylor and secretary Elliot, in truly helpful style. The following invitation is being sent out:

THE TIME: October 25, 26, 27, 1917. THE PLACE: Beverly Hills Hotel, Los Angeles. THE EVENT: Convention, Electrical Supply Jobbers Association of the Pacific Coast.

You are invited. You have been with us before, so it is unnecessary to describe the program, both work and play. But in order that hotel reservations may be made and possibly transportation arranged, please make out, sign and return to me answers to the following questions. (Return this letter but **be sure and sign.**)

Q. How many in your party? (Specify men, women and children.) A.———.

Q. Shall you go auto, train or boat? A.———.

Q. What kind of hotel reservations do you wish? Rates are $4.00 without bath, $4.50 and $5.00 with bath. A.———.

Q. Will you join a party leaving Wednesday night, Oct. 24, Owl or Lark? (Arrangements to be made based on replies.) A.———.

Signature,————.

Only those answering will be taken care of and receive further notices, so answer the summons or be considered an electrical slacker.

ALBERT H. ELLIOTT,
Secretary.

P. S. Literature on Beverly Hills is being sent you.

California Electrical Contractors and Dealers

The California Association of Electrical Contractors and Dealers is now holding a most successful quarterly gathering at Fresno, detail reports of which will appear later.

A new policy for direct bidding on electrical work has recently been adopted by the Electrical Contractors' and Dealers' Association of San Francisco, Cal. In explaining the new method of operation for members, the association says:

Efforts have been made in the past to impress upon the persons and firms to whom electrical contractors submitted bids for electrical work that such bids represented considerable expense and labor and should be treated as confidential, but for some unknown reason this was not found to be the case.

In line with our past efforts, we find that the only remedy for the situation is to submit our bids to the architect or owner direct at some particular date, time and place. In order that this matter may not be unwieldy to the architect or owner we have limited such bids to $500 or over, or, in other words, on all electrical work costing $500 or over the bids shall be given direct to the architect or owner and none other.

Accordingly, no electrical contractor member will submit any bid for electrical work, the cost of which is $500 or more, except direct to the architect or owner or his representative, who shall set a date, time and place for the receipt of such bids, at which time and place such bids shall be opened. The contract for the electrical work shall be awarded to one of the contractors whose bid has been received at such time and place.

BUILDERS OF THE WEST—XV

A. E. CHANDLER

Water in the West is as vital to its upbuilding and maintenance as bread is to the human system. The intricate and diverse laws governing the uses of water that have of necessity grown up about us in the several commonwealths of the West have required the workings of many master minds in their coordination and interpretation. To unravel this tangled mass and to step it down in words that make them available to the needs of man is no small task. To the quiet and retiring member of the California Water Commission, A. E. Chandler—teacher and writer—this issue of the Journal is affectionately dedicated in recognition of his service to the West in the interpretation of water and its uses.

San Francisco Section of A. I. E. E.

Before a crowded hall at the club rooms of the San Francisco Engineers' Club, the first meeting of the fall season for the San Francisco Section of A. I. E. E. was held on Friday, September 28, 1917. The subject of the meeting was "The Civilian Engineer and the War," by J. D. Galloway, and "Engineering Problems of the War," by Mr. Frank Rieber. Mr. Galloway is Chairman of the Committee on Engineering and Inventions of the State Council of Defense, and Mr. Rieber is head of the Rieber Laboratories, now engaged in important Government work. The discussions of the evening proved highly educative in spreading desirable facts that should be known to any one engaged in attempting to solve the submarine problem. Lars Jorgensen, the president of the section and C. F. Piatt, the chairman of the papers committee, are to be congratulated.

Los Angeles Jovian Electric League

As the forms for this issue go to press, reports come from Los Angeles stating, without detail, that the annual election of officers took place for the Los Angeles Jovian Electric League before the most enthusiastic meeting of the year. C. D. La Moree of the Westinghouse Electric & Manufacturing Co. acted as chairman of the day, who introduced James W. Gerard, former U. S. Ambassador to Germany. A stirring talk was delivered in behalf of the Liberty Loan subscriptions and new ideas for helpful League meetings were outlined, details of which will be published in the next issue of the Journal of Electricity.

Oregon Society of Engineers

The first lecture of the engineering extension courses by the Oregon Agricultural College was given on Thermics by Prof. Otto B. Goldman, Saturday evening, October 6, 1917 at 8:00 p.m. at the East Side Library, E. 16th and Alder streets.

These courses are of vital importance to the Society and to the engineering profession. The courses are open to non-members, and all are urged to bring their friends.

San Francisco Engineers' Club

The Engineers' Club of San Francisco had a short luncheon talk Thursday, October 11, 1917, at which attorney Edgar D. Peixotto spoke on "Liberty Bonds."

The great event in the life of the club for the season is in preparation for October 25. On that date Ira N. Hollis, president of the American Society of Mechanical Engineers, is to be the guest of honor. As Mr. Hollis is an engineer of international repute and a brilliant speaker, an unusual attendance is anticipated.

San Francisco Electrical Development and Jovian League

On all sides the prevailing spirit of the San Francisco Electrical Development and Jovian League seems to portend an activity for the coming months that bids well to surpass all previous efforts. The new officers for the current term are planning events that will instill such a spirit of helpfulness and co-operation into the League membership as to insure an attendance at the meetings hitherto unaccomplished. The meeting for November 24 will be a notable one. Ira N. Hollis, president of the American Society of Mechanical Engineers, a brilliant speaker and one well-versed in affairs perplexing the industry, will be introduced by John A. Britton, general manager of the Pacific Gas & Electric Company. In addition to the usual attendance of the membership, the electrical and mechanical engineering societies will be urged to attend.

The new officers of the League are as follows:

Officers Elected

President—Robert Sibley, Editor Journal of Electricity.
1st Vice-President, R. E. Fischer, commercial department Pacific Gas & Electric Co.
2nd Vice-President—H. C. Reid, pres. Cal. Ass'n Elec. Contractors and dealers.
Secretary-Treasurer—J. D. Redpath, sec'y Cal. Ass'n Elec. Contractors and Dealers.
Members of the Executive Committee—W. S. Berry, sales manager Western Electric Co.; E. O. Shreve, apparatus manager General Electric Co.

The meeting of October 3rd at which Ambasasdor Gerard was the speaker of the day was unusually enthusiastic and helpful. And on October 10th the ringing words of John F. Neylan, former chairman of the State Board of Control, in behalf of the Liberty Loan, will long be remembered in its stirring appeal. A. H. Halloran of the Journal of Electricity in expressing the ideal of service most fittingly introduced the speaker.

The Jinks and Smoker to be given by the League on the evening of November 1st at Elks Hall is the talk of the hour.

Annual Convention of American Association of State Mineralogists

The situation with regard to meeting the demand for petroleum products and other "war minerals" is being given careful consideration by many branches of the Federal and State Governments. The annual convention of the American Association of State Geologists has been called to meet at St. Louis, October 8 to 15, for this particular purpose, and in view of the important position which California occupies relative to this matter, Governor Stephens has authorized State Mineralogist Fletcher Hamilton to attend and offer the hearty co-operation not only of the State Mining Bureau, but of the mining public of the State.

It is Mr. Hamilton's intention to particularly emphasize the conditions existing in the petroleum industry in California, where stocks are being rapidly depleted in the face of unprecedented drilling activity and the widespread demand for gasoline and similar derived oil products.

THE CONVENTION OF THE NATIONAL ASSOCIATION OF ELECTRICAL CONTRACTORS AND DEALERS

Ideas of the west have permeated the new Orleans Convention of the National Contractors' Association. As the forms for this issue of the Journal of Electricity go to press special telegraph reports to the Journal of Electricity indicate that a decided victory has been won for the spirit of helpfulness and co-operation so long upheld by W. L. Goodwin and other leaders of electrical thought in the West, as indicated the following message from our correspondent:

National Contractors' Association adopts Goodwin plan without a single dissenting voice. By unanimous vote at its New Orleans meeting October 8 to 13, the National Electric Contractors' Association of the United States enthusiastically adopted the "Goodwin plan" for scientific merchandising together with a new form of constitution and by-laws prepared by a committee consisting of James R. Strong, Earnest McLeary and William L. Goodwin.

Under this new organization plan, the National Association will be kept in the closest possible touch with State

W. L. Goodwin in characteristic attitude when driving home a point

and local organizations, each of which will form a part of the national, and new opportunities will be opened up for the electrical contractor dealer along scientific merchandising lines, which are expected to create a real retail electrical trade among the 30,000 sellers of electrical goods in business today.

Bill Goodwin's address, "The ills in the industry and their remedies through the proposed National Association of Electrical Contractors and Dealers" was the event of the convention. His proposals were spiritedly endorsed by many speakers including Colonel Robley S. Stearnes, president of the National Association, G. M. Sanborn, past president, H. B. Kirkland, Samuel Adams Chase, of the Westinghouse Company, J. Nelson Shreve, Habirshaw Wire Company, and every other man who spoke on the subject.

Nearly four hundred contractors from all parts of the United States attended the New Orleans convention, which besides its record attendance was marked by one of the most elaborate entertainment programs in the association's history, arranged by the local committee, under President Robley S. Stearnes.

HAPPENINGS IN THE INDUSTRY

Sierra & San Francisco Power Company Buys La Grange Plant

The California Railroad Commission has authorized the Yosemite Power Company to sell to the Sierra & San Francisco Power Company of San Francisco for $450,000, plus the cost of additions and betterments from Dec. 1, 1916, its electric production, transmission and distribution property and utility business known as the La Grange division. The property sold consists of a water right on the Tuolumne River near Indian Bar, a water conduit 17 miles (27.37 km.) long and a 900-k.w. hydroelectric plant at La Grange, a transmission and distribution system and the electric lighting and industrial power business in Stanislaus county, east of the San Joaquin River, south of the Tuolumne River and north of the Merced River, including the towns of Turlock, Denair, Ceres, Hughson, Hickman, Waterford and La Grange.

Electric Power for Mining

The mining interests centering around Jerome, Arizona, have been assured an adequate supply of electric power for the immediate future through the opening of the new electric plant of the Arizona Power Company at Tapco. The plant represents an investment of $800,000. It is provided with three large steel storage tanks for oil, which is used as fuel; one tank provides sufficient storage for the operation of the plant for fifteen days with a continuous output of 5,000 kilowatts. The two auxiliary tanks provide storage sufficient for a twelve-hour run of 6,000 kilowatts current output. The water supply is from the Verde River on which the plant is located. The plant is equipped with four oil-fired boilers, each with a rated capacity of 767 horsepower, two Worthington duplex oil pumps, a single unit turbine engine, generator, and exciter, made by the General Electric Company, and four transformers of 6,000 kilowatts capacity. Power is transmitted over the company's general lines at 45,000 volts to the various substations.

Increased Demands for Power in Nevada

The Nevada-California Electric Corporation reports that the demand for service during the summer has necessitated planning for the installment of two new plants and the enlargement of two of their present plants. The company's Barstow extension now under construction is expected to be ready for operation the first of November. The high price of silver and increasing demands for power, are helping the company in Nevada and considerable developments in the mining of tungsten near Bishop, Cal., are proving of advantage. Business throughout the territory is good, with the exception of the Riverside-Redlands district where next winter's oranges were ruined by the excessive heat.

Electricity's Service in War Times

The Pacific Power and Light Company has found ten different ways in which it is helping to win the war. It furnishes electricity to shipyards and to manufacturing establishments turning out products for war purposes. It furnishes water and light for public buildings and cities. It helps in the transportation problem and makes communication possible in its district by means of the telegraph and telephone. It furnishes power for wireless stations. To help the food supply, it supplies power to flour mills, canneries and drying establishments. It provides the motive power for irrigation pumps and later helps to preserve the products grown on irrigated soil by furnishing energy for refrigeration plants.

Decision on Collisions Between Street Cars and Automobiles

A case of considerable interest to street railroads in the matter of collisions between street cars and automobiles at street crossings was decided by the Supreme Court of California, Department No. 1, on April 20, 1917 (S. F. No. 7251).

The case is known as Arnold et al. v. San Francisco-Oakland Terminal Railways and was tried in the Superior Court of Contra Costa County at Martinez, California. A $30,000 verdict was rendered by the jury.

It involved in its determination the question of the negligence of the street car company and the contributory negligence of the automobile driver, together with a discussion of the last clear chance doctrine as applied to such collisions.

Of great significance is the language of the Court bearing upon the respective obligations of the motorman and the automobile driver in the discussion of the last clear chance principle. It was pointed out by the Court that a street car cannot go upon the street except upon its rails and hence that it has the better right to that space to which others must yield when necessary; that it was the duty of the automobile driver upon approaching the crossing to give way to the street car which was about to pass at the same time, if, to avoid a collision, it was necessary to give the right of way to the street car, since the automobile driver could do so and the street car could not; that the motorman of the street car was not required to presume that the automobile driver would not perform this duty, but had the right to presume that he would stop or turn aside; that so long as it appeared that the automobile driver with reasonable care could stop his automobile or turn it to one side or the other so as to avoid a collision and there were no obvious indications that he might not do so the motorman had the right to assume that the automobile driver would do so and upon that assumption could proceed along the track.

The decision would seem to place squarely up to the drivers of automobiles the obligation to turn out of the way or stop and so provide to the street car the right of way where any danger of collision might result from an attempt to force upon the street car a right of way to the automobile.

Utility Asks for Rate Increases

The Pueblo Gas & Fuel Company has filed a petition with the Colorado Public Utilities Commission for rate increases. The company asks that it be allowed to abandon the "dual" meter system and charge one rate ($1.10) for gas for illuminating or fuel purposes. The petition also contemplates increases of 5 cents per 1000 cu. ft. (145.2 cu. m.) in gas for industrial purposes, and from $1 to $1.20 net for gas sold through prepayment meters. If granted, the new rates will increase the company gross revenues about 8 per cent, and also reduce operating expenses materially through abandonment of the dual meter system.

Range Sales Increase

In spite of three increases in prices of ranges during the current year, the Pacific Power & Light Company has sold more than 113% of the number of ranges connected to its lines a year ago.

Comparative Costs of Electrified vs. Steam Roads

The Chicago, Milwaukee and St. Paul has electrified four hundred and fifty miles of its lines from Harlowtown, Montana, to Avery, Idaho, and has under present construction an electric installation which will carry it from Avery to Seattle, five hundred miles more. It has been found, concerning the four hundred and fifty miles already under electric operation, that against a cost of $1,750,000 for coal from its own mines it costs the company now but $550,000 a year to operate the line with electricity. Furthermore, under the old system one-third of the road's equipment was requisitioned for coal-hauling purposes.

New Railway Electrification

The Salt Lake, Garfield & Western has completed plans for the electrification of its line and work on the project has already been started. The approximate cost of the work will be $250,000.

Joint Pole Progress

Since the inauguration of the San Francisco Joint Pole Agreement in April, 1916, the Pacific Gas and Electric Company has combined equipment with member companies on 1602 joint poles. This has resulted in reducing the number of poles on the streets by 2217.

New Insulator Tests

The Pacific Gas and Electric Company is at the present time engaged in taking down and testing every one of the large insulators on the 60,000-volt system of feed wires between Santa Rosa and Petaluma, and a crew of fifteen men, some from headquarters and some from the local district, are now engaged in the work.

New Cars for Honolulu Trolley System

To facilitate the transportation of a constantly increasing number of passengers over the trolley lines of the Honolulu Rapid Transit & Land Co., 10 new cars to cost in the neighborhood of $80,000 have been ordered from an American mainland manufacturer and are expected in Honolulu within three months.

Gas Company Denies Competition with Electricity

A motion to dismiss the complaint of the North Coast Power Co. has been filed with the Public Service Commission by the Portland Gas & Coke Co. of Portland, Ore. The power company under the certificate of public necessity act passed by the last Legislature, is endeavoring to restrain the gas company from entering the Tualatin valley as a competitor, contending that the territory, so far as heat and light are concerned, is now adequately served. The gas company contends that gas and electricity are not competing commodities in contemplation of the act.

Power of City Regarding Electrical Inspection

In determining whether a city council's delegation of duties and powers as to electrical equipment was warranted, the controlling consideration is not that the power may be unreasonably or oppressively exercised, since every presumption is that it will be honestly and reasonably exercised, according to the Supreme Court of California (166 p. 348). A Pasadena ordinance requiring repairs to electrical equipment in private houses on written notice of the city electrician, if he determines that the equipment is dangerous to life or property, without specifying the tests by which he shall determine such question, is not void as unwarrantedly conferring upon the city electrician judicial or legislative powers, nor because its terms are indefinite, arbitrary or oppressive. Although in equity the court in making its decree adapts its relief to the state of facts existing at the close of the litigation, where an ordinance the enforcement of which it is sought to enjoin is amended so as to confer a right of appeal from the city electrician to the council, the plaintiff's mere failure to appeal does not foreclose his right to resort to the courts to restrain enforcement of the ordinance on the ground that it is void.

Suit Against Accident Commission in Washington

A suit has been started in the superior court of Thurston County by the Washington Water Power Company of Spokane against the industrial insurance commission of the state to restrain it from collecting premiums either for the first aid or industrial insurance on the ground that the last legislature in enacting the law to exempt steam roads by virtue of the fact that they do interstate business, included electric lines doing an interstate business.

TRADE NOTES

New Power Loads

The Municipal Railway of San Francisco has begun operations on the new Church Street line and is running thirty cars, requiring 800 k.w., and the older lines have increased their demands so that the total railway load has increased from 55,000 to 92,000-kilowatt hours daily, or a 60 per cent increase. To insure continuous service the feeder to the Twin Peaks Tunnel was tied to the Church Street line, another feeder was doubled in size, additional taps were installed on Geary Street, and the extension of the 11,000-volt line to the new Station "E" was rushed to completion so that the new station could pick up its share of the load.

The 2400-volt service to the Pelton Water Wheel Works at Nineteenth and Harrison streets is nearly completed and when finished will provide for 300 horsepower at 240/480/2400 volts, three-phase.

New business in prospect for the Arkansas Valley Railway Light & Power Company at Pueblo, Colorado, includes 200 horsepower in motors for the Empire Zinc Company at Canon City, which is enlarging its plants.

The Richmond Division of the Western States Gas & Electric Company has connected an additional installation covering 25 horsepower in motors for Marsh Brothers' Paint Plant.

The National Carbon Company (American Ever Ready Battery Company) at Eighth and Brannan streets, San Francisco, is now being taken care of in their new plant, 200 h.p. and 2000 lights.

The Pacific Sugar Corporation has recently completed a very large sugar factory on the Whitehall Estate, in the near-vicinity of Tracy, in San Joaquin county. This sugar factory is modern in every respect and it is expected to be in operation in time to handle this year's crop of sugar beets. Contracts have been signed with the Pacific Gas and Electric Company for electric service to the extent of 150 horsepower.

The National Ice Company, Fifteenth and Alameda streets, San Francisco, has recently decided to replace the steam engines at present operating its ice-making machines with electric drive operated by a 350-horsepower motor. The operation is one of twenty-four hours per day, three hundred and sixty-five days in the year, and it is predicted the installation will be successful in every particular.

The Linde Air Products Company is operating a plant at Emeryville, Cal., for the manufacture of carbide and kindred chemicals. The plant is being operated night and day with an installation of approximately 300 horsepower.

The Moran Company, meat packers, is now engaged in erecting a large cold storage and meat-packing establishment in South San Francisco, which will be completed some time this fall. Total installation amounts to approximately 300 horsepower.

Electrical Activities Due to War

It has become a habit of the Union Iron Works to call frequently for additional power. The Pacific Gas & Electric Company have just provided for another 200 h.p. increase, making a total of 400 horsepower added recently.

The Spring Valley Water Company has requested service to the extent of 250 horsepower for pumping purposes to supply water to Camp Fremont, the new army cantonment at Palo Alto.

The Pacific Coast Steel Company, operating in South San Francisco, is today one of the most important of California's manufacturing industries. The Pacific Gas & Electric Company has been called upon to supply an additional 2000 horsepower, making a total installation of approximately 5000 horsepower. A detailed write-up with numerous views is now being prepared, and will be published in this magazine within the next few months.

One Seattle firm reports a large order from the cantonment for wire sockets, lamps and fixtures for the Y. M. C. A. building under construction; also several orders from Portland district for electric ranges for apartment houses totaling nearly $10,000.

The Astoria Pulp & Paper Company is installing 20 horsepower in motors in three units, purchased through the Pacific Power and Light Company at Portland; McEachern shipyard is now installing over 100 horsepower; Wilson shipyard about 200 more; Geo. F. Rodgers & Company, 275; Astoria Flour Mill about 150; Far West Milk Company about 50, besides other small installations.

Changes in Personnel

The many friends of Tom Finigan, Pacific Coast representative in San Francisco for the American Brake Shoe Foundry, will be interested to hear that he has gone to Chicago to take a position as acting vice-president of the American Brake Shoe Foundry. He will be the chief executive of this company west of Chicago and also have charge of sales and operation, including five manufacturing plants west of Pittsburg. Mr. U. J. Mulligan, formerly assistant to Mr. Finigan, will take his place in San Francisco.

Stanley & Patterson Company, Inc., of New York City, placed their Pacific Coast Agency in the hands of H. B. Squires Company. In addition to the well-known Faraday bells and Stanley & Patterson specialties, this line now includes the P R bells and a very complete "Quality First" De Veau telephone apparatus and specialties.

Incorporations and Changes

The Automatic Controller & Manufacturing Company of Ogden, Utah, has been incorporated with a capital stock of $100,000 to manufacture electrical and other machinery. The company will take over the patents granted to Cleveland Redfield. The officers are: Cleveland Redfield, president; J. W. O'Brien, vice-president; William J. Stone secretary; Thomas Q. Whitehill, treasurer.

In order to adequately take care of the growing demands of the business in the Northwest the warehouse and sales-office of the Western Electric Company has just moved into new and commodious quarters at 84 Marion street.

The Bridgeport Brass Company of Bridgeport, Conn., announces the removal of its New York office to suite 2236 Woolworth Building, 233 Broadway, where more commodious quarters have been provided. The telephone number, Barclay 6440, remains unchanged.

It is rumored that the Blaw-Knox Company of Pittsburg is contemplating erecting a factory in the San Francisco district at an early date for the manufacture of transmission towers for high tension transmission lines and other specialties carried by that company.

The Salt Lake & Ogden Railway Company, operating between Salt Lake City and Ogden, has changed its name to the Bamberger Electric Railroad Company.

Demands for Electrical Equipment

The Inland Electric Company, 1011 Sprague street, reports a brisk demand for chandeliers and fixtures for the many modern homes that have been erected in Spokane this year. The company has also just completed installation of a master and secondary clocks for the Standard Electric Time Company in the North Central high school.

Fairbanks-Morse Company, Spokane, was awarded contract for the major portion of the equipment, including gas engines, exciter sets and storage tanks at $9,380 for light plant to be installed by Harlem, Mont. The Electric Construction Company of St. Paul was awarded contract for pole line and switch board, also commercial and street lighting circuits.

Work on the Down-Town Triangle lighting system for San Francisco has commenced. There are to be 128 ornamental standards, each having two lamps equipped with special glassware, the whole making an appearance similar to the "Path of Gold" lighting on Market street.

Electricity on the Farm

A campaign on farm lighting systems is being waged in the Northwest at carnivals and fairs, bringing excellent results. Inquiries are pouring in. Stocks are ample and shipments are satisfactory.

In an article on the subject by P. N. Bernard, in a Kalispell paper recently, the following paragraphs appeared:

"Flathead County has lost this year through drought more than the installation of electrical energy on our farms would cost. The alfalfa crop in the Flathead is thoroughly established as well as sweet clover and red clover. The feeding values are also established. These are no longer problematical. The Flathead is gradually, yes, rapidly, going into alfalfa. This means dairying, stock raising, diversified and intensified farming. It means that farms are going to raise double the amount and that there need be no short crops. The power lines will be extended into the county seven and one-half miles into townships 28 and 29, range 22. The motors will range from five to twenty horsepower in size. The five horsepower motor, wiring, etc., will cost the farmer for installing $400 to $500, and the 20 horsepower possibly $1,000.

"Flathead County this year would have saved the price of installation on its ranches had they had irrigation. I believe this is the most important development step taken in this county."

The Farm Land Investment Company is now engaged in the cultivation of approximately 3000 acres of rice in the vicinity of Arboga, Sutter County, California. Electric power is used for pumping water to the extent of approximately 700 horsepower.

Washing Bottles by Electricity

The sales department of the Pacific Gas & Electric Company has recently made a very interesting installation of electric water-heating at Napa Soda Springs. There has been installed a bottle-washing machine manufactured by the Yundt Company of Milwaukee, which consists of a large steel tank approximately seven feet square, thoroughly insulated with Sil-O-cel brick and cement. In this tank are two compartments, and an endless chain arrangement by which the bottles are carried down into first one compartment and then into the other; they are then dropped onto an inclined steel apron which leads to a revolving brush for cleaning the outside, after which they are placed in the rinsing machine, which shoots a stream of cold water into each bottle. The machine is operated by a one-half h.p. motor, and the water is maintained at a temperature of 120 to 140 degrees F. by two Kercher automatic circulation-type heaters of 6 kw. capacity each. The machine is capable of washing 1600 bottles per hour, and the current consumption will run approximately 4000 kw. hours per month. This method of heating requires no attention whatever, and is giving the most perfect satisfaction.

Action Against the Puget Sound Traction L. & P. Co.

A second action has been brought by the city of Seattle against the Puget Sound Traction Light & Power Company in an effort to compel the company to comply with its franchise obligations and pave its right of way in streets where the remainder of the surface has been paved. A similar suit instituted several months ago and argued before Judge McIntosh, resulted in the handing down of a memorandum opinion by the court declining to issue an order pending action by the state public service commission on a petition filed by the company more than two years ago, asking to be relieved of the paving as well as other franchise obligations.

LATEST IN EVERYTHING ELECTRICAL

(The tapping of hot wires has been a fruitful source of accidents in the past—and consequently has constituted a problem of some moment in the industry. Below is a recently perfected device for accomplishing this safely. Mention is further made of other electrical devices recently introduced upon the market.—The Editor.)

A NEW DEVICE FOR TAPPING HOT WIRES

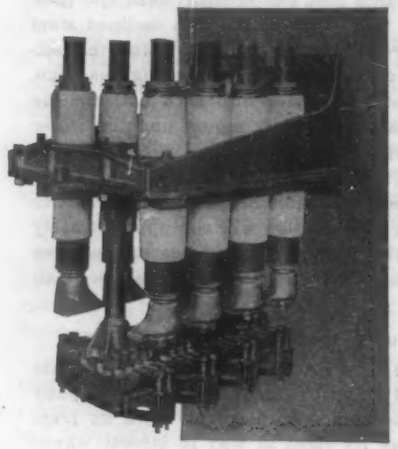
Tapping Machine in Operation

A new departure from all previous hot tapping devices has recently appeared in the trade. All that is necessary to make a tap is to take a piece of No. 6 or No. 8 annealed copper wire, tap one end of wire to the dead branch line by hand, feed the other end into the machine, shove the machine up and on to the hot main-line wire at the point desired, turn the crank at the bottom of the insulated handles until all the wire is wound on to main line wire, then reverse the direction of crank, turn backward until the machine stops; pull machine away from main line, and the tap is made. The machine wraps the tap wire around the main line wire just like a man would do it by hand if the line was dead. The position of man while doing the job is well below all hot wires.

The device is the invention of H. B. Bush of Redlands, California.

PIPE OR WALL-MOUNTING BRACKETS FOR PANEL-MOUNTING OIL CIRCUIT-BREAKERS

Oftentimes a user will have a spare panel-mounting breaker that will just fit his need in a new installation except that he must mount it on the wall or on a pipe frame. Or a standard breaker for panel mounting may fit the requirements of capacity and method of trip better than the standard pipe or wall-mounting breaker. To enable the panel-mounting breaker to be mounted on the wall or on a pipe frame, the Westinghouse Electric and Manufacturing Co. is making a line of special brackets which are described more fully in their new bulletin on "Oil Circuit-Breaker Accessories."



TWO-BEARING, THREE-UNIT MOTOR-GENERATOR SETS

Two rubber manufacturing companies in Ohio have each recently installed two three-wire, direct-current motor-generator sets that in construction are a departure from the usual practice. Instead of being of the old four-bearing, three-unit type or the two-unit type with a three-wire generator as one of the units, these sets consist of three units with only two bearings.

These sets, which were designed and built by the Crocker-Wheeler Company, Ampere, N. J., consist of a 845 k.v.a., 2200-volt, 60-cycle, 3-phase synchronous motor driving two 250-k.w., 125-volt compound-wound interpole generators.

The use of three units results in greater unbalance overload capacity and greater flexibility of the direct-current voltage than is obtainable with a two-unit set having a three-wire generator as one of the units.

As compared with the old four-bearing, three-unit construction these two-bearing units are much simpler in construction and have the following advantages: The absence of outboard bearings makes the brushes more accessible for adjustment and the unit can be assembled, dismounted and cleaned more readily. Perfect bearing alignment can also be secured with greater ease as self-aligning bearings are used. The machines can, hence, be erected with less labor. Because of the shorter length of the set less floor space is required. Couplings which in some cases constitute a weak link are eliminated.

NEW USES FOR THE HEDLITE HEATER

In following up the policy of "localizing heat" adopted by the Hotpoint Electric Heating Company, when they introduced their Hedlite Heater to the trade, they have recently secured contract through the lighting company in Los Angeles, Cal., covering the installation of 30 of their Hedlite Heaters in the Tuberculosis Sanitarium of Independent Order of Foresters in Lopez Canyon, a short distance from Los Angeles.

These Hedlite Heaters will be installed, without the stands, on the under side of the table in the dining room, radiating the heat downward to strike the floor and be radiated up; by this means keeping the bodies of those at the dining table warm, rather than attempting to heat all the air in the room. In other words, they heat the individual instead of heating the room. Inasmuch as the diners will only be in the room 20 minutes, or half an hour during meals three times a day, it seemed unnecessary to attempt to heat the entire room, accommodating over 100 people, when it would only be occupied this short period of time.

SYNCHRONOUS MOTORS DRIVE CITY WATER PUMPS

Water-pumping, on account of its high load-factor, is a load which many central stations have found profitable. One of the more recent installations of this character is that supplied by the Camden Iron Works for the Del Air plant of the Camden, N. J., water-supply system. This consists of two pumps having a total capacity of 10,000,000 gal. per 24 hours.

A neat brick building houses the apparatus which is placed about 12 ft. below ground level. There are two 12 in. centrifugal pumps, double-suction, single stage, each connected through a horizontal shaft to a 200 h.p. Westinghouse synchronous motor. There are also two rotary vacuum pumps each connected to a 10 h.p. Westinghouse induction motor.

Power for this station is received from lines of the Public Service Company at 2200 volts, and used in the main pump motors at this voltage. Transformers are provided to serve the vacuum pumps at 220 volts, and for lighting purposes.

All the electrical equipment in the new station was furnished by the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa.

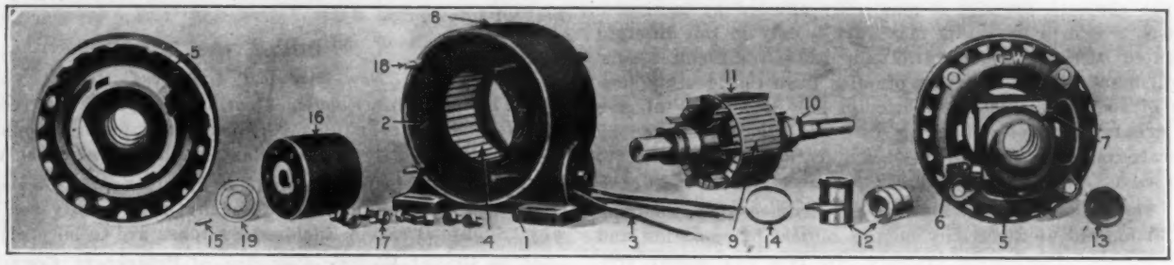
A NEW SMALL SQUIRREL-CAGE INDUCTION MOTOR

A new line of induction motors has been recently placed on the market by the Crocker-Wheeler Company, Ampere, N. J. These motors, known as the C-W Form P motors, are of the squirrel-cage type, ranging in size from one-half to three horsepower, and are designed for constant-speed operation on sixty-cycle polyphase circuits.

The mechanical construction of these motors is compact, rugged and simple. Rigid frames and end shields, liberally designed shafts and bearings, ample air gaps and good insulation enable these motors to withstand the severe service met with by this type of motor.

Good starting torque and high power-factor are among the electrical features of these motors, the long and successful experience of the Crocker-Wheeler Company in designing and building motors for application to all classes of service resulting in this design of motor in which the electrical characteristics are combined in such a way as best to meet the requirements of small-motor applications.

Slotted feet cast integral with the stator frame facilitate accurate belt-tension adjustment.



Detailed View showing the Nineteen Parts that Comprise the New Motor

NEW OIL CIRCUIT BREAKERS

To their well-known line of type B oil circuit breakers, the Westinghouse Electric & Manufacturing Company of East Pittsburg, Pa., have added the two types of breakers illustrated. These are designated as type B-2 and B-3; they are for use on alternating current circuits up to 23,000 volts. Type B-2 breakers have a carrying capacity of from 300 to 2000 amperes; type B-3 of from 300 to 1200 amperes.

Distinctive features of this line are rigidly clamped porcelain pillar bushings, self-cleaning butt brush contacts, auxiliary arcing contacts and spring-accelerated opening. Due to careful design, these are the most compact single-frame breakers produced.

Type B-2 breakers are furnished for panel-mounting, hand-operation, or for wall or pipe-frame mounting, electrical operation. Type B-3 breakers are furnished for wall or pipe mounting only, for hand operation through bell cranks, or for electrical operation. For both types, tripping may be either automatic or by hand.

A NEW UNIVERSITY EXTENSION COURSE FOR UTILITY MEN

An extremely interesting university extension course for public utility men has just been prepared by the Extension Division of the University of California. The course is being given under the leadership of Paul Sinsheimer, formerly connected with the California Railroad Commission and a well-known figure in the utility life of the West.

The course will consist of lectures and discussions on financial, legal, engineering, administrative, rate and accounting methods, under commission regulation.

The list of prospective speakers contains the following names:

From the Railroad Commission: Max Thelen, president of the Railroad Commission; Edwin O. Edgerton, commissioner; Frank R. Devlin, commissioner; Alexander Gordon, commissioner; H. D. Loveland, commissioner; Douglas Brookman, attorney; Richard Sachse, chief engineer; L. R. Reynolds, chief auditor; Frederick O'Brien, recorder of the commission.

From others formerly associated with the commission: J. T. Shaw, attorney Pacific Telephone & Telegraph Co.; R. A. Thompson, director of the valuation of the interstate commerce commission of the Western Division; Allan Matthew, attorney Western Pacific R'y; Harvey Sanborn, rate expert and attorney; Arthur Kelly, consulting engineer; Arthur Roehl, railroad expert and attorney; Paul A. Sinsheimer, former bond expert of the Railroad Commission.

Registration may be made at 62 Post street, Room 330, in San Francisco.

GOVERNMENTAL ENGINEERING POSITIONS OPEN

The following calls have been received from the Government by the Intercollegiate Intelligence Bureau at the University of California, Berkeley. If you are interested, kindly communicate with the Bureau immediately.

Call 53, Assistant Engineers in Forest Products. Service in the Department of Agriculture. Salary: $1200 a year, or more. Applicants must be graduates in mechanical or civil engineering and should have had several years' experience in the drying, treating, or testing of wood.

Call 54, Phyicists for Forest Service, Department of Agriculture. Salary: $1200 a year. Applicants must have special training and experience in physics and should have had several years' experience in drying, treating, and testing of wood.

Call 55, Engineer in Forest Products, Department of Agriculture. Salary: $1800 a year, or more. Applicants must be graduates in mechanical or civil engineering and should have three or more years' experience in forest products research such as drying, treating, and testing of wood.

Call 56, Mechanical Engineer for Forest Service, Department of Agriculture. Applicants should be graduates in mechanical engineering with experience in kiln drying of lumber.

Employment in the case of the above four calls will probably be in laboratories at Madison, Wisconsin, with comparatively little field work. The posts are for the duration of the war and possibly longer, but no assurance can be given concerning the tenure of office. Appointments will be made under the rules of the Civil Service Commission.

Call 63, Electrical Engineers. Salary: $3,000 a year. These men are wanted to enter the Navy, with commissions of lieutenant, junior grade. They must be technical graduates and must have had at least three years in manufacturing, testing, and designing. The men will be subject to detail on battleships, in navy yards, or elsewhere. The work will all be in the field and not in the office.

GOOD BOOKS AND BULLETINS FOR THE ENGINEER

Operation and Maintenance of Irrigation Systems

By S. T. Harding, Assistant Professor of Irrigation at University of California. Published by McGraw-Hill Book Co., Inc., New York. Size 6x9 in.; 271 pp.; cloth binding; illustrated. For sale at the Technical Book Shop, San Francisco. Price, $2.50 net.

This book discusses the operation and maintenance of irrigation systems under the following general chapter headings: Maintenance of Canals; Maintenance of Structures; Organization; Methods of Delivering Irrigation Water; Measurement of Irrigation Water; Rules & Regulations; Payment for Construction and Operation Charges; General Operation; Accounts.

The preface states, "The subject of this volume is necessarily one of practice rather than of theory. As in other similar subjects, practice is materially affected by local conditions, which in irrigation may vary widely in the different irrigated sections. Such variations make it difficult to distinguish the principles of the practice from the local application of such principles. An attempt has been made to give the general principles that may be recognized, illustrated by typical examples of their local application, rather than to fully cover all local variations in practice."

The author has contributed many articles to the columns of the Journal of Electricity on the subject of operation and maintenance of irrigation systems. He is a well known irrigation investigator with the faculty of the University of California. This book should receive an immediate and hearty reception among all engineers interested in the subject matter it contains.

Street Railway Fares

By Dugald C. Jackson, Professor of Electrical Engineering and David J. McGrath, Research Assistant in Electrical Engineering at the Massachusetts Institute of Technology; size 6x9 in.; 169 pp.; published by McGraw-Hill Book Co., New York City, and for sale by the Technical Book Shop, San Francisco. Price $2.50.

That the flat-rate fare system as used on practically all of the street railway lines in this country is an inheritance from the horse-car days is the conclusion reached by Professor Jackson and Mr. McGrath after an exhaustive study of electric railway traffic and fares throughout the country. The book is in effect Bulletin No. 14 of the Massachusetts Institute of Technology, being the report of an investigation carried on in the research division of the Electrical Engineering Department of that college. Briefly, the problem as presented here is as follows:

1. The owners of street railway systems are entitled to just treatment and equal protection by the laws and no more.
2. Many companies are not earning a fair return at the present time, operating upon the usual 5-ct. fare basis; others are obviously making ample earnings.
3. Attempts to meet increased costs by increasing unit fares to 6 cts. or more have resulted in reduction in passenger traffic.
4. To meet increasing costs of service and to properly prepare for extensions of existing systems, the street railways in the United States will sooner or later be forced to adopt a system of rates based more nearly on the length of haul.

The material has been presented with the aid of tables and charts so that the data and conclusions are readily available to street railway officials and municipal officers.

The Principles of Airography

By Alexander McAdie, Professor of Meteorology, Harvard University and Director of the Blue Hill Observatory; size 6 by 8½ in.; 318 pp.; published by Rand McNally and Company of Chicago, Ill., and for sale by Technical Book Shop, San Francisco. Price $3.00.

For the layman as well as to the student of meteorology, the science of the air has its fascinations—and these are apparent in Professor McAdie's extremely readable as well as scientific presentation of the subject. Much new material in connection with the exploration of the upper air has accumulated since the latest textbook on meteorology has been published in this country and this has been included in the present work in convenient and condensed form. The book further emphasizes the use of the new c. g. s. system of units, classifies clouds according to origin rather than appearance, and furnishes studies of ice storms, snowfall equivalents and water supply. Useful charts of flood occurrence and others for the special use of aviators are included. In more than one respect, the book is distinctly a pioneer in its field.

The author, who for so long a period occupied the head position in the U. S. Weather Service with headquarters at San Francisco, is well known to engineers and men of the electrical industry of the West. The book should receive a cordial welcome by all interested in this new and promising field of knowledge.

BULLETINS

New Electrical Appliances

The Hotpoint Electric Heating Company has recently sent to the trade an unusually attractive piece of publicity showing the electric appliance as an aid to Red Cross work.

In a little leaflet entitled "A Plea for Safety," the Detroit Fuse & Manufacturing Company has recently set forth why "Square D" Steel Enclosed Switches are to be preferred.

The Bryant Electric Company of Bridgeport, Conn., has issued a series of beautifully printed booklets on several of its products, including flush heat control, bayonet sockets, canopy taps, "Spartan" receptacles and sockets for candle fixtures.

Westinghouse Electric Ware—electric heating and cooking appliances, such as flat-irons, toaster stoves, percolators, milk warmers, radiators, immersion heaters and solder pots are described in Catalogue 8-C just issued by the Westinghouse Electric & Manufacturing Company of East Pittsburg, Pa. The "Sew-Motor" for sewing machines is also described.

Upbuilding the Electrical Industry

The Industrial Accident Commission for its September issue of the Safety News contains a very beautiful and comprehensive description of the Safety Museum located on Market street in San Francisco.

The Public Service Commission of Oregon has published an appraisal and report on the electric and water utilities of the City of Eugene, this making of a report on a municipal plant over which they have no jurisdiction representing a new departure in their practice.

The Western Electric Company in accordance with its broad policy of selling the electrical idea is placing a large a large quantity of forceful advertising in popular magazines in order to assist the electrical contractors in their various campaigns. In the Habirshaw matter attractive displays of the wide uses of household appliances are made.

Believing that the advertising problem is not to sell an industrial plant manager Westinghouse Mazda lamps, but rather to overcome his indifference to the general subject of lighting, the company has prepared two books in which lighting is almost a secondary consideration. In other words, the company has endeavored to treat with the problems of the industrial plant manager and show in a logical way the relation of good lighting to those problems. The ideal in view is a most commendable one as is the matter contained in the publications referred to.

Helping to Win the War

The Society for Electrical Development announces that there will be no National Electrical Week Celebration this year, owing to war conditions.

Attention is called to Food Pledge Week beginning October 14 by a recent Bulletin of the Public Information Division of the United States Food Administration.

Literature covering the recent War Convention of the Chamber of Commerce of the United States is being circulated by that body.

"The Effect on Business of Recent Statutes" is the title of War Bulletin 19 of the Chamber of Commerce of America. The regulation of the food, feed and fuel industries is here discussed.

How a Gas and Electric Company can help the problem of food conservation by giving space to Government exhibits is told in a Bulletin Vol. I., No. 5 issued by the Trade and Technical Section of the U. S. Food Administration, Washington, D. C.

New Electrical Apparatus

Bulletin 182 of the Crocker-Wheeler Company contains a brief description of their new Form P Induction Motors.

A new sixty-four page bulletin has been received from the Sprague Electric Works describing and indexing their panel boards and cabinets.

The Barnes Lindsley Manufacturing Company of Portland, Oregon, have recently issued a booklet on Douglas Fir Cross-Arms, not only setting forth the values of their own product, but also giving important information as to the tests used in inspecting such work by the U. S. Government.

"Phono-Electric" Trolley Wire applications throughout the traction world are handsomely illustrated and interestingly described in Bulletin Ten from the Bridgeport Brass Company of Bridgeport, Conn. Special emphasis is placed on its dependability.

Hubbard & Company have issued a supplementary bulletin to their general catalogue fully illustrating and describing Peirce Presteel Racks and Brackets. The universal dead ending clevis designed by L. M. Klauber of San Diego is one of the several devices shown.

Bulletin 610 from Edison Storage Battery Company, attractively portrays the use of Edison storage batteries in lumber transportation. In addition to the description of the construction and care of the battery it presents illustrated descriptions of lumber tractors, industrial locomotives and surface carriers in many mills throughout the country.

"Wire in Electrical Construction" with a supplementary phamphlet of notes, is a 150-page bound book published for the convenience of its customers by John A. Roebling's Sons Co. of Trenton, N. J. The material is mostly tabular with explanatory text, including weights and measures, conversion factors, areas of circles, wire gauges, copper, iron, stranded aluminum and insulated wire.

The General Electric Company has prepared and is distributing a loose leaf binder containing five of their latest bulletins on Wires and Cables, as follows: Bulletin No. 49300, Armored Cables; Bulletin No. 49302, Wires and Cables —General; Bulletin No. 49301—Varnished Cambric and Paper—Insulated Cables; Bulletin No. 49304—Conductors Insulated with Vulcanized Rubber Compound; Bulletin No. 49303—Splicing Materials and Junction Boxes. Every user and purchaser of wires and cables should have a copy of this handy guide, as it contains valuable information regarding every phase of this particular branch of the electrical industry.

Miscellaneous Bulletins

Longmans, Green and Co., Publishers, have published a bulletin listing their recent publications.

A tabulation of mine accidents and a listing of explosives, lamps and motors permitted to be used in mines is included in a recent bulletin issued by the Bureau of Mines.

"When All the West was Wireless" is the title of a booklet honoring Col. W. F. Cody (Buffalo Bill) and proposing a monument in tribute to America's Pioneers.

D. Van Nostrand Company have recently gotten out a new catalogue of scientific literature on technical, industrial and engineering subjects.

The Rand McNally & Company of New York City have published indexed pocket maps of Oregon, California and Washington which may be purchased at the Technical Book Shop in San Francisco for 25 cents. The location of railroads and electric lines, counties, congressional townships, cities, towns, villages, post offices, lakes, rivers, etc., is included.

IMPROVED VENTILATED COMMUTATING POLE RAILWAY MOTOR

The General Electric Company has just issued bulletin No. 44417-A, describing in detail the GE-258 Ventilated Commutating Pole Railway Motor which has been developed to help solve the problem of electric railways in rapid and economical city transportation by the use of light weight cars.

In general details of design and construction set forth in Bulletin No. 44417A of the General Electric Company, the G-E 258 Motor follows G-E railway motor practice, incorporating the special features and manufacturing processes of standard ventilated motors while light weight, compactness, and rigidity are obtained to a considerable degree by the use of ball bearings for the armature shaft. It also possesses to the fullest extent the characteristics of reliability and low cost of maintenance inherent in General Electric railway motors.

SPEED-REGULATING PANELS WITH AUTOMATIC PRESSURE REGULATOR

An Automatic Pressure Regulator described in Bulletin No. 48319-A of the General Electric Company provides the most convenient means of controlling the speed of a motor operating an equipment where changes in air or liquid pressure will automatically vary the speed, in order to maintain the pressure within certain limits. If the regulator is adjusted, the motor is automatically retarded or speeded up until the pressure is again constant.

Benjamin-Starrett Panel Boards and Cabinets are the subject of General Catalog No. S-2 from Benjamin Electric Manufacturing Company. These are so standardized that the single units can be assembled to care for any job from a

New Catalog for Panel Cabinets

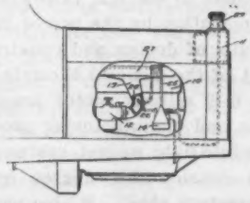
small residence to a large industrial plant. In the words of the manufacturer "they comply with all the conditions making for safety, economy, convenience, appearance and permanency of installation."

WHAT WESTERN INVENTORS ARE DOING

The growing uses of the electric water heater as a supplement to the electric range is bringing this problem to the forefront in the electrical world. The West with its abundant water power is particularly interested in finding a means to answer this need and below is a suggestion for such a heater. Descriptions of a water vaporizer for internal-combustion engines, an automatic water feed device for oil burners, a gas and shrapnel land-mine and an electric circuit-closer for automobiles follow.—The Editor.)

1,239,380. **Water-Vaporizer for Internal-Combustion Engines.** William H. Fox, Hollywood, Cal.

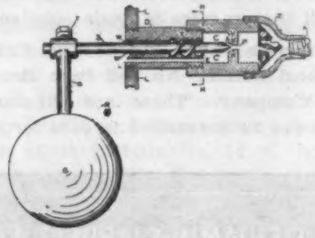
A vaporizer, comprising a water reservoir, a vaporizing chamber mounted in connection therewith, means whereby said chamber will connect with the intake manifold of an internal combustion engine, means whereby the suction of



the engine will act to create a vapor within said vaporizing chamber and draw it into the intake manifold in combination with a gaseous fuel passing therethrough, means whereby water and vapor may be delivered to said reservoir from the radiator of said engine, and means whereby the aqueous vapor drawn from the vaporizing chamber to the intake manifold will be heated as it is delivered thereto.

1,239,267. **Automatic Water-Feed Device for Steam-Generators, Oil-Burners, etc.** Joseph L. Groves, Los Angeles, Cal.

A valve of the type described consisting of a body having helical grooves in the wall of the valve-stem opening



and a channel parallel to the valve-stem opening, a valve seat spaced from the valve-stem opening within the body, and a stem turnably mounted in the valve-stem opening engaging with the valve seat.

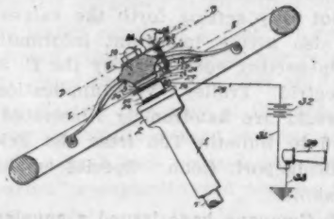
1,239,134. **Gas and Shrapnel Land-Mine.** John R. Steel, San Francisco, Cal.

A gas and shrapnel land mine, comprising a container

having an annular and a central chamber formed therein, together with communicating ports, said central champer adapted to receive a shrapnel bomb and an explosive charge for its expulsion and said annular chamber adapted to receive a substance which, when ignited, generates and liberates a gas, means for igniting the explosive charge to expel the bomb and to ignite the substance contained in the annular chamber, and means for exploding the bomb after expulsion and at a predetermined elevation.

1,239,236. **Electric-Circuit Closer for Automobiles.** George F. Voight, San Francisco, Cal.

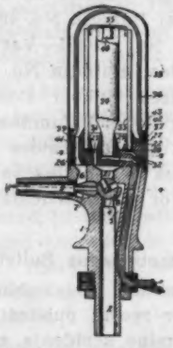
The combination with the steering mechanism of an automobile comprising a steering wheel fixedly mounted on the upper end of a steering wheel shaft journaled in a hollow



stationary standard, of a circuit closer comprising a stationary contact element forming a switch terminal for an electric circuit which element is insulatingly mounted on the standard adjacent its upper end, a movable contact element forming the other switch terminal of said electric circuit which movable contact element is movably supported by the steering wheel shaft and provided with a section extending above the steering wheel adapted for engagement by the hand of the operator and provided with a second section extending below the steering wheel and in close relation to the stationary contact element and adapted to engage therewith for closing the circuit, and resilient means supported by said steering wheel and in engagement with said movable contact element for normally holding the latter element out of electrical contact with said stationary contact element.

1,239,325. **Electric Water-Heater.** Ernest C. Webster, Oakland, Cal.

In an electric water heater, the combination of a block of insulating material, a central metallic conductor and a tubular metallic conductor, around which said block is



molded, a central electrode, a tubular electrode around said central electrode, said electrodes being secured respectively to said conductors, and a casing around said electrodes, said electrodes being supported only at their lower ends, their upper ends being free.

NEW ELECTRICAL DEVELOPMENTS

(Typical of new electrical development for the past semi-monthly period are the many bids for motor and pumping installations that are being called for by various municipalities of the West. The equipment in motors and pumps asked for by the city of Portland as noted below is an instance of this activity. Other notations on new electrical development throughout the West may also be gleaned from the following lines.—The Editor.)

FINANCIAL

PORTLAND, ORE.—An increase of 14 per cent on the net earnings of the Pacific Power & Light Company in August over the earnings for the same month of 1916, was reported in the monthly statement from the treasurer.

NORTH MADRAS, ORE.—The directors of the North Unit Irrigation Association voted to hold an election October 29 to determine if the people in the proposed district are in favor of issuing bonds. The issue will be for $5,000,000.

PHOENIX, ARIZ.—The Arizona Corporation Commission authorized the Phoenix Gas & Electric Co. to issue $550,000 bonds, $185,000 of which are to be debentures, the proceeds to be used for extensions and general improvements.

SAN FRANCISCO, CAL.—A statement of the condition of Municipal Railway reserve fund, issued by the Board of Public Works, shows the amount in the fund to be $1,149,816.89. This sum consists of investments in City Library bonds, with interest, $547,643.45, and cash, $601,673.44.

SAN FRANCISCO, CAL.—The preferred and common shares of the San Joaquin Light & Power Corporation were called in the listed department of the San Francisco Stock and Bond Exchange for the first time recently. The preferred was quoted at 75 bid and the common at 5 bid, 9 asked, but no sales were recorded.

SAN DIEGO, CAL.—The San Diego Consolidated Gas & Electric Company has applied to the State Railroad Commission for permission to issue $1,000,000 in bonds. The company announces an expenditure of $687,000 this year, of which $284,000 will be used for the extension of its electric transmission lines to San Juan Capistrano to connect with the hydroelectric power line of the Southern California Edison Company of Los Angeles.

SAN FRANCISCO, CAL.—The State Supreme Court, in a recent decision, upheld the judgment of the lower court against the Pacific Gas & Electric Co. and the Coast Counties Light & Power Co. in suits to recover taxes paid to the State and alleged to be excessive. The Pacific Gas & Electric Co. sued to recover $41,000 and the other corporation sought to recover $1693. E. D. Roberts, former state treasurer, was made defendant in the actions.

FRESNO, CAL.—Earnings, statement twelve months ended May 31, 1917, shows that the San Joaquin Light & Power Co. earned its interest charges 2.19 times during the period. Net income from operations, plus miscellaneous revenue, amounted to $1,091,927, and interest charges were $493,202, leaving a balance before depreciation of $598,725. Depreciation charge is eliminated from this statement. Total interest charges for the previous 12 months were $482,498, showing an increase for the 1916-17 period of $10,703.

SAN FRANCISCO, CAL.—Report of gross and net earnings for the Western States Gas & Electric Company for the month of August shows marked advance over earnings for the corresponding month of 1916. The figures in detail follow, together with report of earnings for the year ended August 31, 1917, and 1916: Gross earnings: August, 1917, $116,849; 1916, $97,515; increase, $19,334; per cent increase, 19.8. Net earnings: August, 1917, $55,428; 1916, $47,084; increase, $8,343; per cent increase, 17.7. Year ended August 31: Gross earnings, 1917, $1,340,331; 1916, $1,218,887; increase, $121,443; per cent increase, 9.9. Net earnings: 1917, $630,712; 1916, $581,353; increase, $49,358; per cent increase, 8.5.

INCORPORATIONS

SEATTLE, WASH.—The Johnson Power Transmission Company has been incorporated here.

LEWISTON, IDAHO.—The Smith Manufacturing & Irrigation Company here has been incorporated.

PORTLAND, ORE.—The Stubbs Electric Company has been incorporated with a capital stock of $50,000.

LOS ANGELES, CAL.—The Renard-Story Electric Company of this city has been incorporated at $25,000.

KAHLOTUS, WASH.—Articles of incorporation have been filed by the Kahlotus and Page Telephone Company.

TRANSMISSION

COEUR D'ALENE, IDA.—The Washington Water Power Company is to construct a power line into the Coeur d'Alenes to cost $200,000, same to be started early in the spring.

TROY, MONT.—Kootenai Light & Power Company has signed a contract to furnish all the electric power necessary to maintain and operate a light, heat and power plant here.

SAN DIEGO, CAL.—San Diego Consolidated Gas & Electric Company has been authorized to serve the towns of Escondido, Fallbrook, and Oceanside in San Diego county.

SAN FRANCISCO, CAL.—Board of Public Works has called for bids for installing electrical yard work in connection with the northeasterly wing of the San Francisco Hospital.

HAILEY, IDA.—A light and power plant is to be installed next year at the mines of the Mascot and Terra Mining Company, according to Charles Peter, president of the companies.

BARSTOW, CAL.—Work will begin at once by the Southern Sierras Power Company on the erection of a new electric transmission line west from Barstow, a distance of 41 miles, at a cost of about $115,000.

The program outlined by Jackson included also the remodeling of the nine mile flume at Sand Bar, just above the Stanislaus plant. This will cost the company $1,500,000, but will double the capacity of the power plant.

BAKER, ORE.—A 66,000 volt transmission line is to be constructed from Robinette to Halfway, a distance of 12 miles, for delivering 200 h.p. to the Corucopia miles. A substation will be erected at Halfway, cost about $30,000.

AMERICAN FALLS, IDA.—Idaho Power Company has awarded contract for construction of a new 5000-horsepower station and closing of breach in dam to Sam Porter at $50,000. The new unit will practically double power now being generated.

VANCOUVER, WASH.—The Interstate Bridge Commission has authorized the installation of an electric generating system to be installed on the Columbia River inter-state bridge, to cost about $7,000. Contract for equipment has been awarded to the General Electric Company at $5,200.

QUINCY, CAL.—According to Lloyd P. Cornell, field manager of the Great Western Power Company, that corporation has decided to build a transmission line from Veramont station near Taylorsville to the Walker copper mine, via Genesee mine, Genesee valley, a distance of sixteen miles.

SEATTLE, WASH.—The Board of Public Works has approved the recommendation to award the contract for furnishing meters for the ensuing year as follows: To the W. R. Hendry Company, $10,000 worth; the Northwestern

Supply Company, $10,000, and the Fobes Supply Company, $7,500.

SAN FRANCISCO, CAL.—Arrangements have been completed whereby the Eureka division of the Western States Gas & Electric Company will secure 1000 kilowatts of hydroelectric energy from the Northern California Power Company. This enables the Western States Company to shut down a steam generating plant.

LOS ANGELES, CAL.—Announcement has been made of an addition to the hydroelectric development of the Southern California Edison Co. at Big Creek. This additional hydroelectric work calls for an expenditure of more than $2,000,000, and the increasing of the production of energy by 12,500 h.p., immediately.

SEATTLE, WASH.—While the plan of the city of Seattle to purchase a completed hydro-electric plant has not been abandoned, bids were not opened October 5 as called for and no date of opening has been fixed. Plans for the plant were approved nearly a year ago and a utility bond issue of $3,000,000 was authorized for the purpose.

SAN BERNARDINO, CAL.—The erection of 39 miles of transmission line from Victorville to Barstow is under consideration by the Southern Sierras Power Company. The proposed line, it is understood, will be extended to Daggett and other sections in the vicinity of Barstow. The contract for construction of line has been granted to F. L. Somers.

COLUMBUS, MONT.—Preliminary work has been started by the Montana Power Company on its new power site on the West Rosebud River. A site for the proposed dam will be surveyed across the mouth of Mystic Lake, and a survey will also be run for a tunnel, which will tap the bottom of the lake a quarter of a mile from the foot of the falls.

SAN FRANCISCO, CAL.—Preparations are being made by the Western Power Company to enlarge its right of way from its power plant in Big Meadows to the Bay region. The company, it is understood, will as soon as rights of way have been secured, erect another high-tension transmission line, paralleling its present lines from its generating plant to San Francisco.

EVERETT, WASH.—At a special cost of $25,000, less the amount spent in developing the property, a thirty months priority right on the water power on the Sauk-Suiattle river in the Washington forest has been granted the American Nitrogen Products Company, Securities building, Seattle. The first unit of the plant is proposed for Darrington and when the three units are completed will cost about $6,500,000, according to report.

FRESNO, CAL.—Work is progressing on the half-million-dollar generating plant of the Pacific Gas and Electric Company that is now being erected on the West Side branch of the Southern Pacific at the north end of the railroad reservation. The machine shop has been completed and concrete is now being poured for the main building. The entire investment will represent an expenditure of at least half a million dollars.

SEATTLE, WASH.—J. J. Agutter & Company, electrical engineers and contractors of Seattle, Wash., have closed a contract for the complete electrification of St. Joseph's hospital at Deer Lodge, Montana, at about $3500. They have about closed up the work in connection with the Frederick & Nelson store building in Seattle. This was one of the largest contracts placed in the northwest for some time, running above $50,000 all told.

CHICO, CAL.—The new concrete dam of the Pacific Gas & Electric Company across Butte Creek, twelve miles above DeSabla, is practically finished, I. B. Adams, who is in charge of the DeSabla district, announced. The dam is 70 feet high and about 150 feet long. It supplants an old log and rock dam which diverted water for the DeSabla and Centerville power houses, and is a part of the program of additions to and betterment of the DeSabla district's system.

SAN DIEGO, CAL.—Board of Supervisors have awarded to the San Diego Consolidated Gas & Electric Company a franchise for the installation of electric power service throughout the county. The award was granted on a bid of that company of $100 for privilege in response to advertisement for bids. The term of the franchise is 50 years, and San Diego county will receive 2% of the gross receipts of the company, beginning five years after contract is entered into.

KLAMATH FALLS, ORE.—The big concrete dam being constructed by the California-Oregon Power Company, just over the Oregon line on the Klamath River at Copco, in California, is now nearing completion. Power machinery is now being set in place in the power house and when fully installed will provide about 50,000 horsepower, which is one-half of the amount ultimately to be manufactured in the two power houses at this place. About thirty days will be required for this concrete to set before the water is turned into the reservoir and it is estimated that it will take the Klamath River about seven weeks to fill up the big reservoir above the dam.

STOCKTON, CAL.—Western States Gas & Electric Company of Stockton has filed an application with the State Water Commission asking permission to appropriate 5000 acre-feet from Medley Lake and 7000 acre-feet from Echo Lake, both in El Dorado County, and 8000 acre-feet from Twin Lakes in Alpine County, for the purpose of developing 2500 horsepower at the existing hydro-electric plant of the American River Electric Company for a period of seven months in the year. There is a proposed main ditch 7.3 miles long and at Medley Lake there is a series of three small dams for raising the water level. At Echo Lake it is proposed to drive a tunnel to draw the level of the lake 40 feet below the natural outlet, said tunnel to be 5x6½ feet in cross-section and 2600 feet long. The total fall to be utilized is 610 feet from dam to water-wheel nozzle, the water to be returned to the south fork of the American River after use.

PORTLAND, ORE.—Bids will be received at the office of the city purchasing agent up to October 29, 1917, at 2 p.m., for furnishing the city one water pumping machine, capacity 1,000,000 gallons of water per twenty-four hours with a discharge pressure of 281 pounds per square inch and a suction pressure of 25 to 28 pounds per square inch. Bid must be accompanied by a certified check payable to the order of the city for ten per cent of bid. Bids will be received at the same time and place for two multi-stage turbine pumps, 1,000,000 gallons capacity, head 281 pounds; two 100 h.p., 2200 volt three-phase, 60 cycle slip ring motors; one multi-stage centrifugal or turbine pump, 500,000 gallons capacity, head 105 pounds; one 40 h.p. three-phase, 60 cycle, 220 volt slip ring motor; one multi-stage centrifugal or turbine pump, 500,000 gallons capacity, head 257 pounds; one 75 h.p., three-phase, 60 cycle, 200 volt slip ring motor. Certified check payable to the order of the city of Portland for ten per cent of bid required.

SAN FRANCISCO, CAL.—The Sierra and San Francisco Power Company is preparing to spend more than $5,000,000 in the construction of reservoirs in the mountains above Oakdale, and in the enlargement of existing ditches and storage dams, according to the statement made before a joint meeting of the Oakdale and South San Joaquin District Boards by H. F. Jackson, general manager of the public utility corporation. These improvements, outlined by Manager Jackson, consist of the enlargement of the Philadelphia ditch, to permit of a greater flow of water for development of power, the construction of the upper Strawberry dam, which will cost $3,225,000, and will take three years. This dam will impound 55,000 acre-feet of water. Then the Donnel's Flat reservoir, to impound 80,000 acre-feet, will be built, estimates for which have not been completed. The program outlined by Jackson included also the remodeling of the nine mile flume at Sand Bar, just above the Stanislaus plant. This will cost the com-

pany $1,500,000, but will double the capacity of the power plant.

TRANSPORTATION

PORTLAND, ORE.—The Portland & Oregon City Railway Company contemplates extending its railway from Baker Bridge to Viola.

SEATTLE, WASH.—H. H. Travers, Arcade Building, was awarded contract for making extension to Division A of the Municipal street railway at $19,544.

SOUTH PASADENA, CAL.—D. W. Lontius, traffic manager of the Pacific Electric Co., has agreed to immediately start the construction of an electric line to Yucaipa valley.

SAN FRANCISCO, CAL.—Oakland, Antioch and Eastern (electric) Railway Company has been authorized to issue $435,853 in short term notes to banks in San Francisco and Sacramento.

SEATTLE, WASH.—Contract for eight one-man passenger cars for the Seattle municipal railway has been awarded to Burton R. Stare of the Northwestern Supply Company, local, at $3,750 each.

SANTA ANA, CAL.—The board of trustees granted to the Pacific Electric Railway Company a franchise to construct, maintain and operate for a term of 50 years an electric railroad across the Irvine Extension.

SAN FRANCISCO, CAL.—Without an opposing voice the Board of Supervisors unanimously adopted the restlutien declaring ftr the acquisition of the United Railroads and instructing City Engineer O'Shaughnessy to begin at once the work of valuing the physical properties.

LOVELOCKS, NEV.—The Commissioners of Storey County have granted the Nevada Valleys Power Company a franchise to erect an electric transmission line over the roads and highways of the county. The company proposes to build an electric power plant in Storey County near the McCarren Ranch on the Truckee River, from which it will distribute electricity in the entire western portion of the State of Nevada, and may possibly extend its service to other adjacent fields.

SEATTLE, WASH.—City council has passed a bill accepting a plan for extension of the city car lines by connecting up the Lake Burien line and Division "A." The plan calls for the expenditure of $350,000 in constructing an elevated road on Washington street, Railroad avenue, Whatcom avenue and Spokane street, and extending from First avenue South to the West Waterway. Expense of construction is to be met by the sale of utility bonds, the interest and principal to be taken from the revenues of the street car system.

GRAND JUNCTION, COL.—The construction of an electric railway from Grand Junction up into the Uintah Basin via Mack, Col., Ouray, Duchesne and Myton to Helper or Colton, via Indian Canyon or the Strawberry Valley, to connect the lines of the Colorado Midland Railroad and the Utah Coal Route, which will take over the railroad of the Denver & Rio Grande between Helper and Provo, is under consideration. C. M. McNeill, vice-president of the Colorado Midland Railroad Company, Colorado Springs, may give further information.

SEATTLE, WASH.—Corporation counsel of Seattle in an opinion given Councilman Will H. Hanna, chairman of the finance committee of the city council, holds that transfer of funds from the city light depreciation fund for the purpose of extending the city car line from 13th avenue West and Thorndike avenue across the Ballard bridge to Leary avenue and Market street is illegal. This is held on the ground that the street railway fund is insolvent. Councilman Erickson, who is fathering the street railway extension of the city car line into Ballard, then asked for an appropriation from the general fund of Seattle in the sum of $12,000. Corporation counsel holds in this case that before money can be taken from the general fund to build an extension to the city railway system, it is necessary to submit the plan for such extension to the people for their adoption or rejection. Some time ago contract for construction of the Ballard extension was awarded to R. H. Travers at $19,554.43. In view of the uncertainty as to the funds for construction, contractor asked to be released and request was granted.

ILLUMINATION

THATCHER, ARIZ.—The city of Thatcher is considering the establishment of an electric light plant.

TROY, MONT.—Council has granted franchise to William B. McDonald to install an electric lighting plant.

LOS ANGELES, CAL.—Sealed bids are being received by the Board of Supervisors for installing a street lighting system in the Walnut Park Lighting District.

SAN FRANCISCO, CAL.—The Bureau of Architecture estimates that the completion of the lighting system for the San Francisco Civic Center will cost approximately $30,000.

BLACKFOOT, IDAHO.—The city council has entered into a new contract with the Idaho Power Company for new street-lighting service, which will greatly increase the street illumination.

SEATTLE, WASH.—The city council, after reconsidering previous action, has passed resolution 5731 accepting the bid of John E. Price & Co. for the $390,000 light and power bonds.

CANYON CITY, ORE.—The lessees of the electric plant at John Day, is is reported, are planning the installation of an electric lighting system in Canyon City. The town is now lighted with gasoline lamps.

OAKLAND, CAL.—Civic organizations of the east bay cities are preparing data for a concerted fight against the application of the Pacific Gas & Electric Company's request for an increase in gas rates. The Company asks an increase from 90 cents to $1.00.

SEATTLE, WASH.—The city council has voted to reject the bid on the proposed $350,000 water department bond issue but to sell the $390,000 light department issue. It was also voted to award the $390,000 issue to the Dexter-Horton Trust & Savings Bank, on a basis of 5 per cent interest at the rate of 92.54.

POCATELLO, IDAHO.—The city council has recently entered into a new street-lighting contract with the Idaho Power Company for a period of ten years. The new contract provides for a complete new street-lighting system, including 355 curb standards and 161 incandescent lamps in the viaduct and subway.

LA JUNTA, COLO.—Arkansas Valley Railway, Light & Power Company has been granted a renewal franchise by La Junta for electric light and power. This action ends an agitation for a municipally-owned electric lighting plant, which resulted two and one-half years ago in a popular vote for a bond issue for this purpose. The bond issue carried by the narrow margin of 11 votes. Subsequently the Public Utilities Commission of Colorado investigated the company's rate charges in La Junta and made certain reductions in the schedule. The rates as then revised will remain in effect under the new franchise.

TELEPHONE AND TELEGRAPH

GREAT FALLS, MONT.—The Milwaukee Telephone & Telegraph Company contemplates installing a duplex system on all its lines.

TROPICO, CAL.—The Pacific Telephone and Telegraph Company has let a contract for the erection of a building here to cost $46,000.

ALBUQUERQUE, N. M.—The Mountain States Telephone and Telegraph Company has finished work in this immediate section and is now working at Tularosa. After that work is completed an additional line of wire will be strung from La Luz to Mountain Park. A new line will also be put on between Alamogordo and El Paso.

A golden opportunity—

Win an $850 automobile - - - first prize
$225 phonograph - - second prize
$50 in cash - - - - - - third prize
$10 in cash - - next twelve prizes

These fifteen prizes will be awarded to those subscribers getting the greatest number of subscriptions for the **Journal of Electricity** between the 1st of November, 1917 and the 1st of February, 1918.

The Judges of the contest

H. F. JACKSON
President Pacific Coast Section National Electric Light Asciation

H. C. REID
President California Association Electrical Contractors and Dealers

ALBERT H. ELLIOT
Secretary Pacific Coast Electrical Supply Jobbers' Association

will certify as to the winners in accordance with the rules printed on the following page. In the event of a tie in the number of points for any prize the award will be made to the contestant having secured the greatest number of *new* subscribers.

You can do your bit toward developing the electrical industry by boosting the **Journal of Electricity,** which has been boosting the electrical business for thirty years. The **Journal** keeps its readers abreast of the times and is the logical medium for the interchange of ideas electrical, particularly in the West.

Why not get into the contest yourself and pass the word along? The list of entries and each man's standing will be published in the JOURNAL during the period of the contest.

Co-operation is the watchword of the electrical industry today. Let's get together in real earnest.